BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE HANDBOOK 36-2235
VOLUME 11

1 NOVEMBER 2002

Personnel

INFORMATION FOR DESIGNERS OF INSTRUCTIONAL SYSTEMS

APPLICATION TO UNIT TRAINING

RECORDS DISPOSITION: Ensure that all records created by this handbook are maintained and disposed of IAW AFMAN 37-139, "Records Disposition Schedule"

NOTICE: This publication is available digitally on the AFDPO www site at: http://afpubs.hq.af.mil.

OPR: HQ AETC/DOZ (Gary J. Twogood)
Supersedes: AFH 36-2235, Volume 11, 1 November 1993

Certified by: HQ USAF/DPDT
(Col Patricia L. C. Priest)
Pages: 142/Distribution: F

This publication requires collecting and maintaining information protected by the Privacy Act of 1974 authorized by 10 USC 8013. Privacy Act system notices F036 AF PC C, Military Personnel Records System; and OPM/Govt 1, General Personnel Records apply.

This volume provides information and guidance for applying the Instructional System Development (ISD) process described in AFMAN 36-2234. This handbook is a guide for Air Force personnel, who plan, design, develop, approve, administer, or manage unit training in the Air Force.

Chapter 1
GENERAL INFORMATION

Overview

Introduction

This handbook serves as a guide for applying the Instructional System Development (ISD) process to the planning, design, development, implementation and management of unit training in the Air Force. It adheres to the policies of AFPD 36-22 and follows the principles and procedures outlined in AFMAN 36-2234. It is intended to be an easy reading guide for both novice and experienced curriculum developers or individuals involved in conducting and managing unit training and on-the-job training (OJT). While it is designed as a "stand-alone" document, you should read and be familiar with AFPD 36-22 and AFMAN 36-2234. You should also be familiar with the training development documents referenced in this handbook, as applicable.

Background

In the past, the Air Force ISD manual and pamphlet were focused on how ISD applied to technical training. There was little or no guidance on applying the ISD process to other areas such as aircrew training, acquisition, education, unit training or on-the job training. The revised AFMAN 36-2234 provides the guidance and procedures necessary for applying the ISD process throughout the Air Force, regardless of the type of education or training being developed. The various volumes of AFH 36-2235 provide specific guidance and procedures for applying ISD to aircrew training, acquisition, education, and technical training as well as unit training and on-the-job training. Other volumes of AFH 36-2235 have been developed to cover application of ISD in other areas.

Purpose

This handbook provides specific information and guidance for using the instructional development process to develop unit training and OJT. It provides information on the ISD model, planning for ISD projects, phases of the ISD process, system functions, and quality improvements.

Is this handbook for you?

This handbook addresses the question: "How do you apply the ISD process in unit training?" It is applicable whether a contractor or an Air Force team develops the training. But is it for you? It is if you can answer yes to any of the following questions:

Are You Responsible For …	**Yes**	**No**
Developing unit-training courseware?		
Developing on-the-job training (OJT)?		
Conducting unit training or OJT?		
Managing or supervising unit training or OJT?		
Are You …	**Yes**	**No**
A training manager, curriculum developer, training supervisor or trainer with little or no experience in ISD?		
A subject matter expert (SME) with no ISD experience?		
An ISD expert (with at least five years' experience with ISD)?		
A novice or "entry-level" curriculum developer?		
A new trainer or supervisor?		

What is ISD?

ISD is a systematic but flexible process used to plan, design, develop, and implement unit training and OJT programs in an effective and cost-efficient manner. It is a total quality process continuously striving to improve the overall education and training programs. ISD ensures that:

There is an education and training need.
There is an effective and cost-efficient solution to the need.
The solution can be implemented.
The solution can be assessed to determine if it meets the need.
Continuous quality improvements are made throughout the process.

Basis for ISD

The ISD process used in the Air Force is based on:

Basic research on how individuals learn.
Basic research on how individuals communicate.
The systems engineering process.
The concepts of instructional technology.

Why use ISD?

Using the ISD process ensures that unit training and OJT programs are both effective and cost-efficient. ISD requires that:

Training design meets specific job requirements that have been identified through training needs assessments (TNA).
Training is designed for all job tasks and knowledge necessary for successful performance on the job.
Training is designed to meet specific training objectives.
Methods and media are chosen to optimize effectiveness and cost-efficiency.
Education and training programs are evaluated to ensure they meet the objectives and revised if they fail to do so.
Trainee data is collected and used to improve the quality of education and training programs.

Goal of ISD

The goal of ISD is to produce trainees who can perform their jobs after receiving training and to reduce overall costs of the training by accurately identifying training requirements.

How to use ISD

ISD is:

Flexible and systematic.
A tool to get the right training for the problem.
Not a lock step, linear process.

How to use this handbook

This handbook is a guide to help plan, design, develop, implement, conduct, evaluate, and manage unit training and OJT. This handbook is used by first identifying the specific tasks or activities to be done and then using the information provided in the handbook to accomplish the task or activity. The following job aid will assist in identifying the sections to be read to accomplish specific tasks and activities.

How to use this handbook (Continued)

Do You Have To …	Yes	No	Page
Plan training?			43
Develop/update training documentation?			22
Define duty position?			78
Perform initial skill evaluation?			78
Define training requirements?			79
Define objectives?			88
Develop training guide?			114
Finalize and validate training?			122

Chapter 2
INSTRUCTIONAL SYSTEM DEVELOPMENT MODEL

Overview

Introduction

Planning, developing, delivering, supporting, and managing a training system requires considerable time and effort on the part of training managers, supervisors, trainers, and subject matter experts (SMEs) such as maintenance supervisors, master technicians, or crew chiefs and curriculum developers who make up the unit training team. It should be noted that all of these SMEs might not be available at all units. The unit training team is responsible for conducting the necessary training needs assessment (TNA) and designing, developing, implementing, conducting, and evaluating the unit training and on-the-job training (OJT) to ensure that performance requirements are being met. The individual efforts of each team member ensure that effective, cost-efficient training is developed and integrated into a total training system using the principles of quality improvement (QI). A total instructional system model includes the phases of ISD, system functions, and the QI process. This chapter will address each of these areas.

Objectives

The objectives of this chapter are to:

Define the phases of the ISD process.
Discuss the system functions.
Explain the QI process.

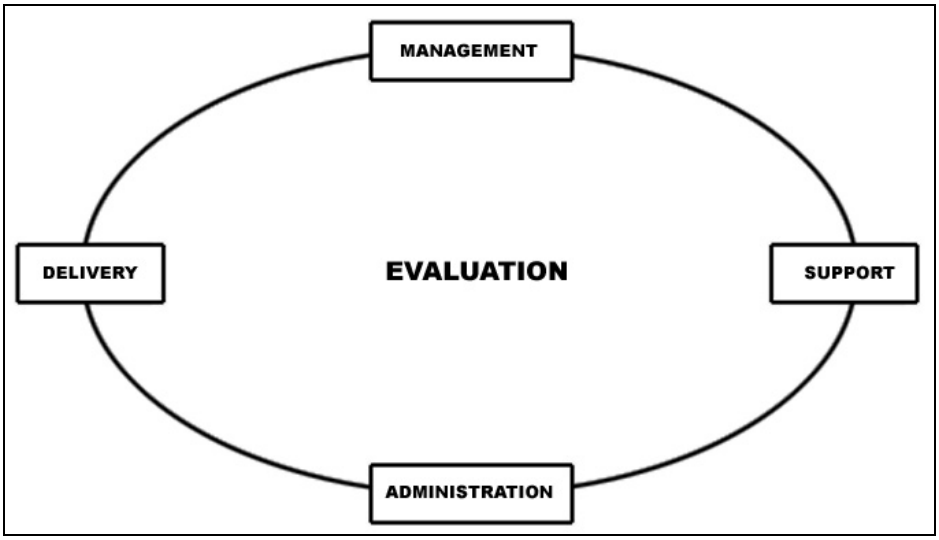
Updated Air Force ISD model

The updated ISD model has been designed to represent simplicity and flexibility so instructional developers with varying levels of expertise can understand the model and use it to develop effective, cost-efficient instructional systems. The model also depicts the flexibility that team members have to enter or reenter the various phases of the process as necessary. The entry or reentry into a particular phase of the process is determined by the nature and scope of the development, update, or revision effort.

System functions

An extension of the system approach places the ISD process within the functional design of a total instructional system. Figure 1 shows the basic top-level system functions of the instructional system: Management, Support, Administration, Delivery, and Evaluation.

Figure 1 System Functions



What are they?

The system functions of the ISD model are:

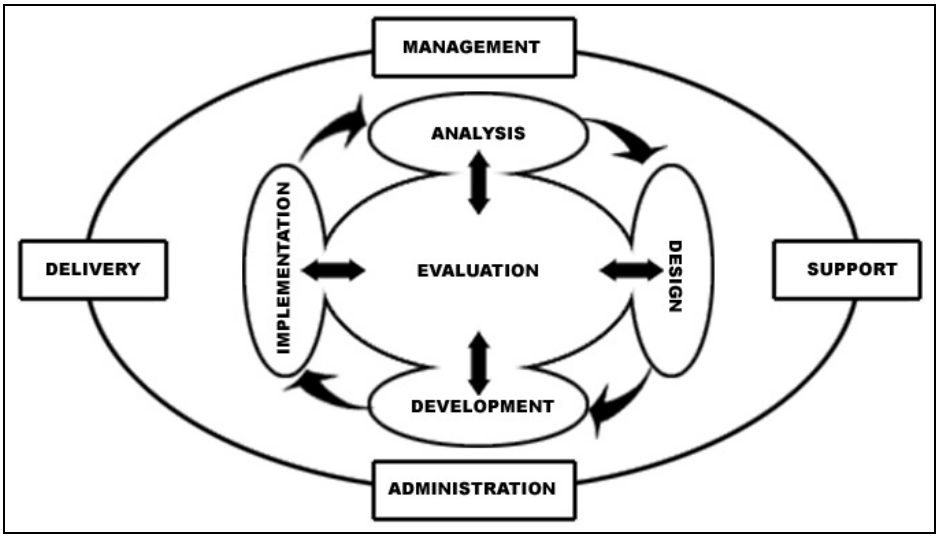
Management—the function of directing or controlling instructional system development and operations.
Support—the function of maintaining all parts of the system.
Administration—the function of day-to-day processing and record keeping.
Delivery—the function of maintaining or presenting all parts of the system.
Evaluation—the function of continuously gathering feedback data through formative, summative, and operational evaluations to assess system and trainee performance.

Relation to ISD

Using these essential functions to design the overall instructional system architecture and then allocating them to the respective instructional system components, or people responsible, ensures that these functions are operational when the total training system is fielded. ISD products are integrated into the total instructional system, and aspects of the system functions are active throughout all phases of the ISD process.

Figure 2 shows the phases most often used in the system approach; Analysis, Design, Development, and Implementation, with continuous Evaluation activities integrated into each phase of the process. The phases are embedded within the system functions. Evaluation is shown as the central "feedback network" for the total system.

Figure 2 Functions with Phases



The instructional development process, which the model summarizes, calls for instructional developers to:

Analyze and determine what instruction is needed.
Design instruction to meet the need.
Develop instructional materials to support system requirements.
Implement the instructional system.

Relation to ISD (Continued)

Evaluation or feedback is a central function that continuously takes place throughout each phase of the ISD process.

Symbolically, Figure 2 shows that all phases of the model depend on each of the other phases. The ISD process allows the curriculum developer or development team to enter or reenter the various phases of the process as determined by the nature and scope of the development activity. The phases of the model are described below.

Analysis phase

In courses tying the content directly to preparing a trainee to do a job, the curriculum developer or development team analyzes the job performance requirements and develops a task list. The developer then analyzes the job tasks and compares them with the skills, knowledge, and attitudes of the incoming trainees. The difference between what they already know and can do and what the job requires them to know and be able to do determines what instruction is necessary. In this phase, the formative evaluation activities begin.

Example: Conducting an initial skills interview with a trainee or duty position interview.

Design phase

In the design phase, the curriculum developer or team develops a detailed plan of instruction including the selection of instructional methods and media, and determining instructional strategies. Existing instructional materials are reviewed during the phase to determine their applicability.

Example: Compare work center requirements and duty position requirements to the members' STS or JQS.

In this phase, the curriculum developer or team also develops the objectives and test and designs instruction. The implementation plan for the instructional system is also developed in this phase and a training information management system is designed; for example, building training records if required. Formative evaluation activities continue in this phase.

Example: Develop a plan to train individuals to meet duty position requirements they are not qualified on.

Development phase

In the development phase, both the student and instructor lesson materials are developed or selected. If the media selected in the design phase included items such as videotapes, sound/slides, interactive courseware (ICW), and training devices, these are developed or acquired. If a training information management system was developed for the instructional system, it is installed in this phase (for example, a load in the Core Automated Maintenance System (CAMS) or an addition to a training chart). As a final step in this phase, the implementation plan is updated.

During this phase, you also validate each unit/module of instruction and associated instructional materials as they are developed. You correct any deficiencies that are identified. Validation includes:

Internal review of the instruction and materials, such as a training plan for accuracy.
Individual and small-group tryouts such as work center or one-on-one training.
Operational tryouts for the entire system.

Revision of units/modules occurs as they are validated, based on feedback from formative evaluation activities such as trainees' Q&A or E&T Specialist. The final step of this phase is to finalize all instructional materials.

Implementation phase

The instructional system has been designed and developed, and it is now time for the system to become operational. In this phase, the instructional system training is accomplished under operational conditions and the results of operational evaluation provide feedback on the graduate's performance.

Evaluation

Evaluation is a continuous process beginning during the analysis phase and continuing throughout the life cycle of the instructional system. Evaluation consists of:

Formative Evaluation, consisting of process and product evaluations conducted during the analysis and design phases, and validation conducted during the development phase. Included are individual and small-group tryouts.

Evaluation (Continued)

Example: Trainer/trainee feedback on a unit or block of training as it is being developed.

Summative Evaluation, consisting of operational tryouts conducted as the last step of validation in the development phase.

Example: Feedback from the trainer, trainees, or certifier on a training course that is being conducted for the first time as a complete training course.

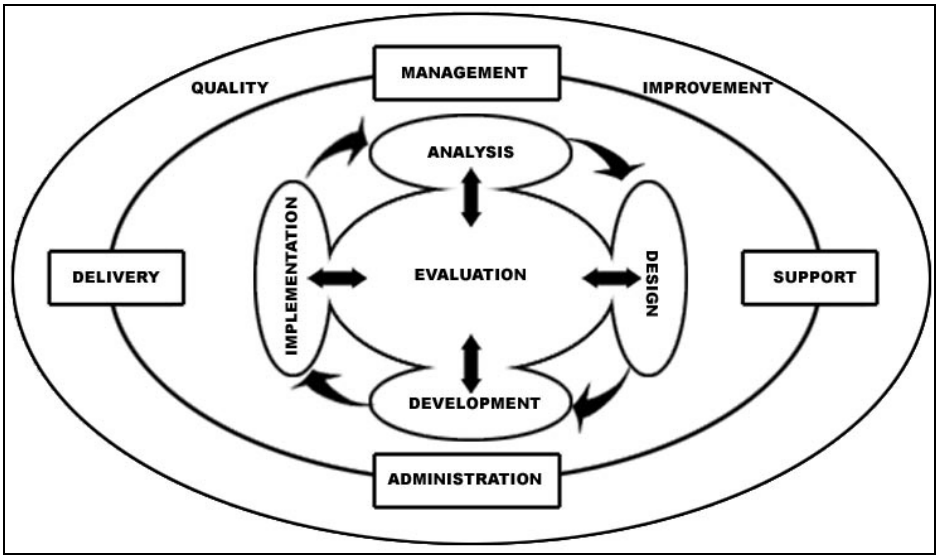
Operational Evaluation, consisting of periodic internal and external evaluation of the operational system during the implementation phase. Each form of evaluation should be used during development, update, and revision.

Example: A staff assistance visit is a form of operational evaluation.

Updated Air Force ISD model

Figure 3 depicts the completed ISD model. This completed figure shows the system functions and ISD phases embedded within the quality improvement (QI) process.

Figure 3 Updated Air Force ISD Model



Updated Air Force ISD model (Continued)

The QI process, further discussed in this chapter, is briefly described below.

Quality Improvement is the continuous, organized creation of beneficial change to the system. The objective of quality improvement is to foster continuous improvement in the process and products of ISD through continuous evaluation and feedback, which is always encouraged. It is an independent evaluation to determine whether the products are meeting the users' needs. The objective of quality improvement is to ensure on-time development of high-quality courseware enabling trainees to reach the desired performance levels in an effective and cost-efficient manner.

The updated model graphically illustrates that:

Evaluation is the foundation of the ISD process.

ISD is a continuous process with the flexibility to enter and reenter the various phases, as necessary, to develop, update, or revise instruction.

All ISD activities take place within and are dependent on the system functions.

Teamwork is required between personnel performing system functions and those designing, developing, and implementing instructional systems.

All ISD activities and system functions focus on continuous quality improvements in the system through evaluation and feedback.

Where to read about it

This chapter contains seven sections that provide a brief overview of the ISD process.

Section A
Total Training System Functions

What are system functions?

System functions should be in place before implementing the training system. The system functions are described below.

Function	Purpose
Management	The practice of directing, controlling, coordinating, and monitoring all aspects of the training system. These functions are normally performed by commanders, supervisors, base/unit EST as well as others.
Support	This provides for and maintains the training system on a day-to-day as well as a long-term basis. Examples are the resources needed to keep equipment functioning such as logistic and maintenance support.
Administration	The part of management that does day-to-day tasks. Includes tasks such as maintaining office supplies, scheduling, maintaining records, and squadron administrative duties.
Delivery	The means by which training is provided to the trainees. Instructors, computers, printed materials, audiovisual programs are all examples of ways training can be delivered. Another example is "hands-on" demonstration performance training conducted by a trainer.
Evaluation	The function of gathering feedback data through formative, summative, and operational evaluations to assess system and student performance.

When you implement them

For the training system to be effective and cost-efficient, the system functions should be "in place" and working before the actual design, development, and implementation processes begin. Normally, the system functions will already be "in place" for you in the unit training environment.

Section B
Analysis

What it is

Analysis is the process of:

Collecting information on job performance requirements of Air Force missions, jobs, tasks, and duties.
Determining the necessary qualifications of the job performers.

Initial skills interviews and duty position certification are examples of the analysis performed at the unit level.

Why do it?

Analysis is conducted to ensure that the right training is designed and developed for the identified tasks needing training.

Where to read about it

Details on the analysis phase of ISD are provided in Chapter 4. Seven topics are listed below.

When you do it

Conduct analysis before beginning to design and develop a new training system, updating or revising an existing system, or starting OJT.

What you get

If the analysis has been properly conducted, valid training requirements will be identified and normally an accurate projection of required training resources can be made.

What you need

To conduct analysis, the following items should be assessed:

- Personnel and equipment
  - Subject matter experts (SMEs)
  - Defense systems
  - Equipment
  - Similar systems or programs
- Documentation
  - Existing training materials
  - Training standards
  - Technical data
  - Engineering data
  - Occupational Survey Reports (OSRs)
  - Job Performance Guides (JPGs)
  - Career Field Education and Training Plans (CFETPs)

Section C
Design

What it is

Training design is like architectural design. You figure out what you want the training to look like and how you want it to work before you build it. The previously performed analysis will help determine the basic structure of the training in the design phase.

Why do it?

You use training design to ensure training quality, save money, and get needed training done on time. One does not just start developing training, just as one does not start building a classroom facility without analyzing the needs, and planning and designing it first.

Where to read about it

Details on the design phase of ISD are provided in Chapter 5. Specific topics are listed below.

When you do it

Training design begins after completing the necessary analysis and before training development begins.

What you get

Proper design will result in:

Instructional objectives (what to teach).
Performance and knowledge tests that measure the objectives (how well the trainee can do the job).
Methods, media, and necessary strategies to deliver the training.
Training information management system (training documentation), if applicable.
Review of existing instructional materials.

What you need

All of the products developed during initial planning and the analysis phase are required to design an effective, cost-efficient instructional system.

Section D
Development

What it is

During the ISD development phase training is developed, validated, and revised, as appropriate. Training development includes activities such as:

Writing (print; e.g., training guide)
Producing/procuring (video or audiovisual materials)
Installing (information management systems; e.g., training documentation)
Building (training devices/simulators)
Validating (formative, summative, and operational evaluation) training
Revising (training materials)

Why do it?

Training development activities are undertaken in order to have a valid training program or product ready for the implementation phase.

Where to read about it

Details on the development phase of ISD are provided in Chapter 6. Four topics are listed below.

Section	Topic	Page
A	Develop Training Guides	112
B	Develop or Acquire Training Media	116
C	Finalize Training Schedule	120
D	Validate Training Program	122

When you do it

Development begins after the design is complete and before the training is implemented (conducted).

What you get

Adequately developed training results in training products that meet the design specifications and, more important, the users' needs.

What you need

For the development phase, the following are needed:

Planning, analysis, and design documents and products
Students and equipment for validation

Section E
Implementation

What it is

In the implementation phase, the training system is implemented and the training or course becomes operational and you start conducting the training.

Why do it?

Training is implemented and conducted to meet the specified or stated training needs of the users. For example, trainees are upgraded when the training provided enables them to perform to the standards specified in the training standard, thus meeting the users' needs.

When you do it

The implementation phase of ISD is entered once the training has been adequately validated and everyone agrees the training meets the unit's training needs.

What you get

Successfully implemented training results in trainees who can meet the established job performance requirements and standards; that is, are certified to perform the required tasks.

What you need

To enter the implementation phase, the following are needed:

A finished training product such as training guides and visual aids
All training system functions in place

Section F
Evaluation

What it is

Evaluation measures the quality, effectiveness, and cost-efficiency of the training system. Evaluation answers the questions:

Is the process effective and cost-efficient?
Are quality products being developed?
How well are the trainees performing on the job?
How can the system be improved?

Why do it?

Evaluation improves the quality of the ISD process and products while producing trainees who can meet job performance requirements and standards.

When you do it

Evaluation begins in the initial planning stages of the ISD process and continues throughout the life cycle of the training system.

What you get

Evaluation provides data on the quality of the ISD process and products and determines whether trainees are meeting job performance requirements and standards.

What you need

To properly perform evaluation, the following are needed:

An operational training plan
Completed ISD activities
ISD products
An operational training system
Graduates of the training
An evaluator (e.g., task certifier)

Section G
Quality Improvement

Introduction

ISD is a continuous, systematic process that incorporates a never-ending evaluation process. The Air Force uses the ISD process as a tool to ensure that quality training systems are developed. It helps training managers and curriculum developers plan, design, develop, and implement quality training programs to train Air Force personnel in the most effective, cost-efficient manner possible. The ISD process implements all of the principles of the Quality Air Force (QAF) program. A process-focused approach is a major way of achieving continuous, measurable improvements in the quality of training. As a structured approach is implemented for process improvements the training design team will identify problems, analyze the problems, and design and develop solutions to the problems in order to improve the process. This section of the chapter covers QI and explains total quality process improvement.

What it is

Quality improvement is the continuous, organized creation of beneficial change to the training system. It is an independent evaluation to determine whether the training is meeting the users' and trainees' needs.

Objectives of QI

The objectives of quality improvement are to foster continuous improvement in the processes and products and to ensure on-time development of high-quality courseware or training that enables trainees to reach the desired performance levels in an effective and cost-efficient manner.

Results of QI

Quality-developed training products result in:

Increased trainee satisfaction.
Products that are easy to use and maintain.
Increased ability of trainees to perform on the job.

Quality-designed training results in:

Fewer errors.
Less rework (and waste).
Higher training success.
Less time spent in developing new or revising training products.
Low life cycle costs.

ISD and quality relationship

All of the principles of quality are implemented in the ISD process. The ISD process ensures total quality in the training environment by continuously evaluating the process and products. The relationship between the key concepts of QI can be easily seen in the ISD process. For example:

Customers:

The customer defines quality. ISD emphasizes criterion-based training. The criteria are directly linked to performance requirements. Field representatives (supervisors, squadron commanders, etc.) identify training requirements, which training providers such as Air Education and Training Command (AETC) or other training organizations are then under "contract" to satisfy. All evaluations are focused on the trainee's actual job performance.

Know your customer. The information gained in the mission/job analysis process gives you or the training design team information that defines the customer's expectations. Since ISD requires all training to be directly tied to job requirements, the customer is the gaining unit or work center. Everything is done on the premise that what the individual needs to do the job determines the training requirements.

ISD and quality relationship (Continued)

Focus on customers. As mentioned earlier, the gaining unit or work center needs to determine training requirements. By continuing to trace the relationship between the job requirements and the individual's needs to do the job, a continual focus on the actual field requirement is maintained. In addition, the ISD process requires that the capabilities, aptitudes, and attitudes of the target audience be considered during the design phase.

Team Players:

Foster teamwork. A training program cannot be designed and developed in a vacuum. In order to develop effective, cost-efficient training, the development team should be in constant touch with the work center and evaluation offices to ensure that the training matches the performance requirements on the job.

Empower your people. ISD is a problem-solving, decision-making model. Since ISD is flexible and since there are many ways to solve a given training problem, a development team should be allowed freedom and given authority to analyze, design, develop, and implement training meeting job performance requirements and standards.

Final Product:

Know your mission. ISD depends on mission and job analysis for the necessary data to design, develop, and implement training. All training must be based directly on mission or job requirements. The quality checks in the analysis process help eliminate training that is unnecessary or unrelated to the job.

Job analysis uses data from many sources, including mission statements found in policy directives or locally developed statements. Curriculum developers also make use of management engineering reports, occupational survey data, and direct observation to determine the actual job requirements.

As part of the job analysis process, a training needs assessment (TNA) is conducted to determine the actual performance problems. In some cases, a problem is not due to a lack of training, but to deficiencies within the job structure

ISD and quality relationship (Continued)

or training environment. The ISD process helps ensure that training is not developed for non-training problems. Training may also be developed as a "preventive" measure — that is, to prevent potential problems and to meet the informational and educational needs of Air Force personnel.

Set goals and standards. The goals and standards for the training design and development effort come in many variations. First, the job requirements and the impact of the performance deficiency determine the timing required for the design and development process and the conducting of the training program. Second, the content of the training is determined by the individual's need to do the job. You or the development team must directly translate the cues, conditions, and performance standards for the job directly into the training program.

Manage by fact. Each phase of the ISD process requires constant evaluation against the job requirements identified earlier in the process. In addition, a variety of tools have been developed to ensure that the design and development decisions are made with supporting data. For example, a number of media selection tools are being used to provide training managers with information that matches the training media with the training requirements. These matches are based on learning theories and development cost factors (money and time). ISD is designed to guide training managers and curriculum developers to the awareness of factors affecting their decisions.

Integrate quality in all phases. Evaluation is continuous quality checking. This is true during each phase of the ISD process, from analysis to evaluation. Built-in checks in each phase ensure the quality of the ISD process and training products with emphasis on the trainee's performance.

Evaluate quality constantly. The ISD process is a cyclic, ongoing process of continuous improvements. As you progress through the different phases of ISD, the processes and products of each phase are constantly evaluated against the training requirements and the principles of learning. The results of the evaluations determine which phase of ISD to enter next. Constant evaluation identifies changes in training requirements due to updates in equipment and personnel, resulting in new ISD efforts to provide the best possible education and training for Air Force personnel.

Basis of process improvement

The basis of process improvement is Quality Air Force (QAF). QAF is a management philosophy and a methodology working together to produce continuous process improvements. It is based on ten principles.

All work is a process.
Processes receive work from suppliers, add value and deliver output to customers.
Anyone from whom a process receives work is a supplier.
Anyone to whom a process delivers output is a customer.
Customers have needs and expectations.
Customers define and measure quality in terms of those needs and expectations.
Quality is meeting customer needs and expectations.
Improving process quality increases productivity.
Processes can be identified, understood, measured, and improved.
Individuals who operate the processes know best how to improve them.

Procedures for process improvements

In order to ensure process improvements, you will need to use a systematic method to identify and correct the causes of the problems. The six steps of process improvements are outlined in the table below, explaining the ISD process in simple terms.

Step	Activity
1	Define the process and determine the main problem areas.
2	Analyze the problems and identify the causes of each.
3	Identify and evaluate possible changes to the process.
4	Implement the changes and monitor the process.
5	Institutionalize the changes.
6	Repeat for continuous improvements.

Ways to implement the procedures

There are many different ways to implement the basic procedures mentioned above. Two of the most common ways are:

"Chart it, check it, change it."
Shewhart cycle (plan-do-check-act).

Each of these techniques uses the six basic steps mentioned above.

Chart It, Check It, Change It

"Chart it, check it, change it" is a systematic approach to continuous improvement. It can be used to analyze any training requirement or capability. It can also be used to determine if a work center's training plan is working. This approach has three principal steps that are shown in the table below and in Figure 4.

Step	What You Do
1 Chart It	Describe the process. Gather data.
2 Check It	Analyze the data. Evaluate the process. Identify opportunities.
3 Change It	Improve the process. Institutionalize the change.

How to use it

Chart It

Using a process flowchart, describe the process to be improved.

Gather data on the process and its products.

Check It

Analyze the data to isolate the problems and opportunities.

Evaluate the process to identify alternative approaches.

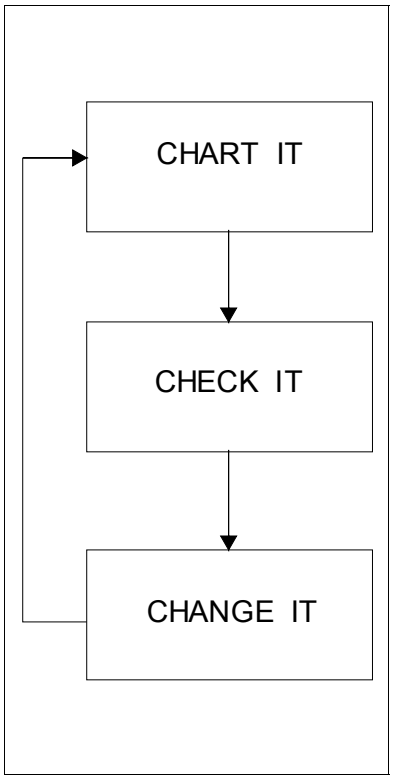
Identify opportunities (i.e., useful changes) from the alternatives.

Change It

Improve the process by implementing changes identified as opportunities.

Institutionalize the changes through training standard-ization, etc. Then use another process (or use this same one again) to make further improvements.

Figure 4 Chart It, Check It, Change It



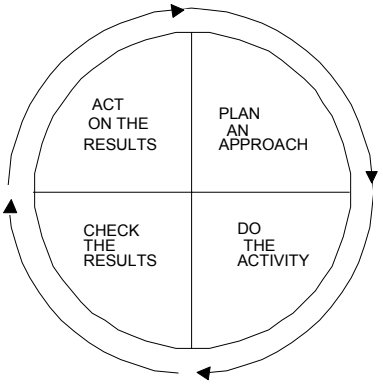
Shewhart cycle

The Shewhart cycle is a systematic approach to achieving continuous improvement in quality. The cycle includes planning, doing, checking, and acting. Because the approach involves repetition, it is represented graphically as a circle in Figure 5.

How to use it

Steps in the Shewhart cycle are:

Figure 5 Shewhart Cycle



Plan an approach for quality improvement.
Study the process flow and any existing data.
Formulate possible improvements, experiments to be run, or additional data to be gathered.
Do the activity planned.
Implement the planned improvement effort. Train the individuals who are responsible for implementation.
Check the results. Measure the results of the improvement effort you implemented against the old procedures. Analyze the data you collected.
Act on the results. If the effort was truly an improvement, standardize and document it. If it was not successful, determine what could be done to improve it, or where the problem was.
Repeat. Continue around the cycle again by planning and carrying out further activities.

Flowchart – A process improvement tool

Many tools are used to make process improvements. One tool often used to analyze process problems is the flowchart. A flowchart is a graphical representation of all the major steps of a process such as an "overblown" task breakdown. It can help:

Understand the complete process.
Identify the critical stages of the process.
Locate problem areas.
Show relationships between different steps in a process.

How to use it

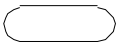
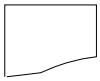
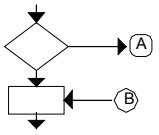
Flowchart steps are:

Identify the process. Define the start point and finish point for the process to be examined.
Chart the ideal process. Try to identify the easiest and most efficient way to go from the start block to the finish block. While this step is not absolutely necessary, it does make it easier to find improvements.
Describe the current process. Chart the whole process (i.e., lay out all the steps) from beginning to end. You can use standard symbols to improve the clarity of the flowchart.
Search for improvement opportunities. Identify all areas that hinder the process or add little or no value. Examine all areas that differ from the ideal process and question why they exist.
Update the chart. Build a new flowchart to correct the problems identified in the previous step.

Standard flowchart symbols

Figure 6 depicts the standard flowchart symbols.

Figure 6 Standard Flowchart Symbols

This symbol...	Represents...	Some examples are...
	Start/Stop	• Receive tasking to develop training. • Complete training development process.
	Decision Point	• Approve/Disapprove. • Yes/No. • Develop training/non-training solution.
	Activity	• Develop objectives. • Develop test. • Produce training materials.
	Document	• Fill out task analysis worksheet. • Update training development plan. • Document evaluation results.
	Connector (to another page or part of the diagram.)	

Using process improvement methods

As previously mentioned, there are numerous process improvement tools that can be used to document and improve the training development process. Curriculum developers or development teams are encouraged to use a process improvement tool such as flowcharting for developing a new process or revising an existing process. Also, if current training development processes have not been documented using process improvement tools, it should be done in order to improve the process.

Example of a training development process

Figure 7 depicts the overall training development process used to develop unit training or on-the-job training (OJT). This flowchart is provided as an example; however, it can be adapted to specific or unique training needs of a unit.

Figure 7 Training Development Flowchart (Part 1)

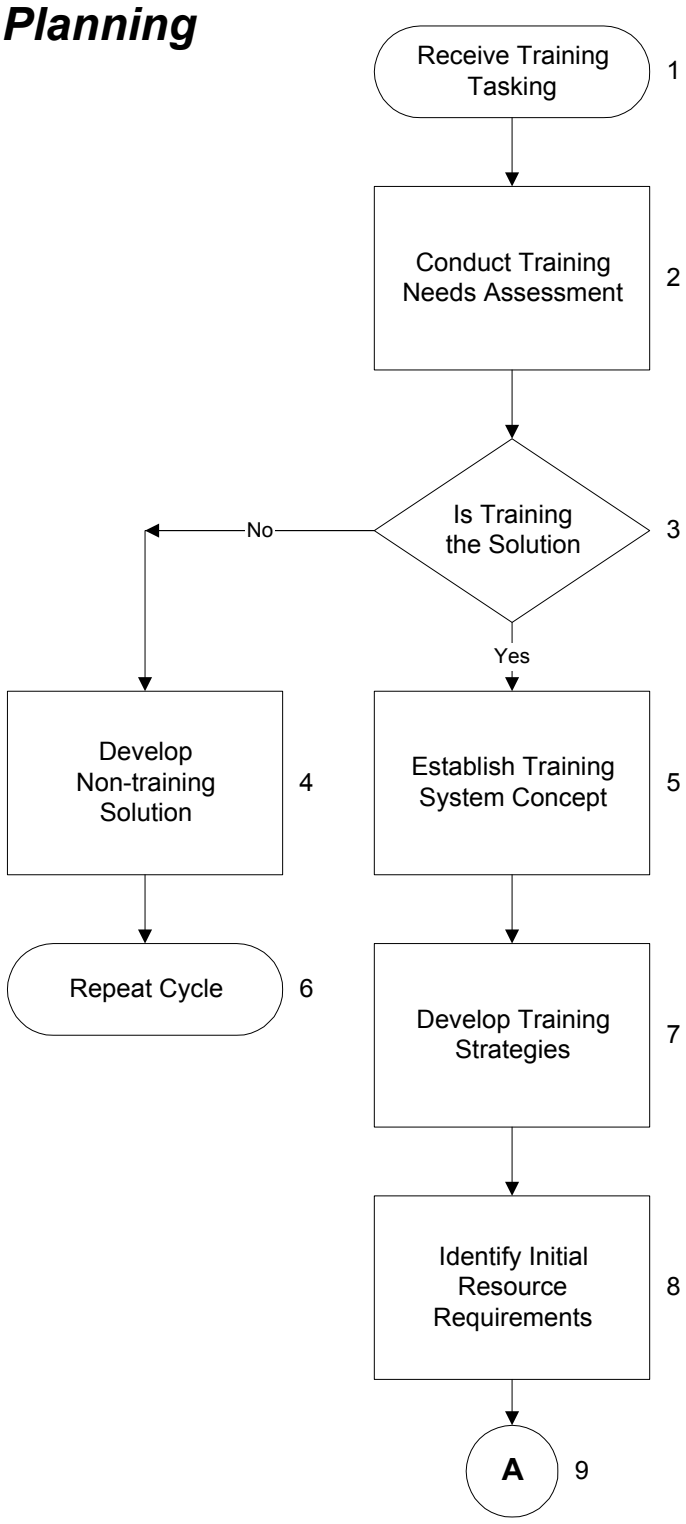


Figure 7 Training Development Flowchart (Part 2)

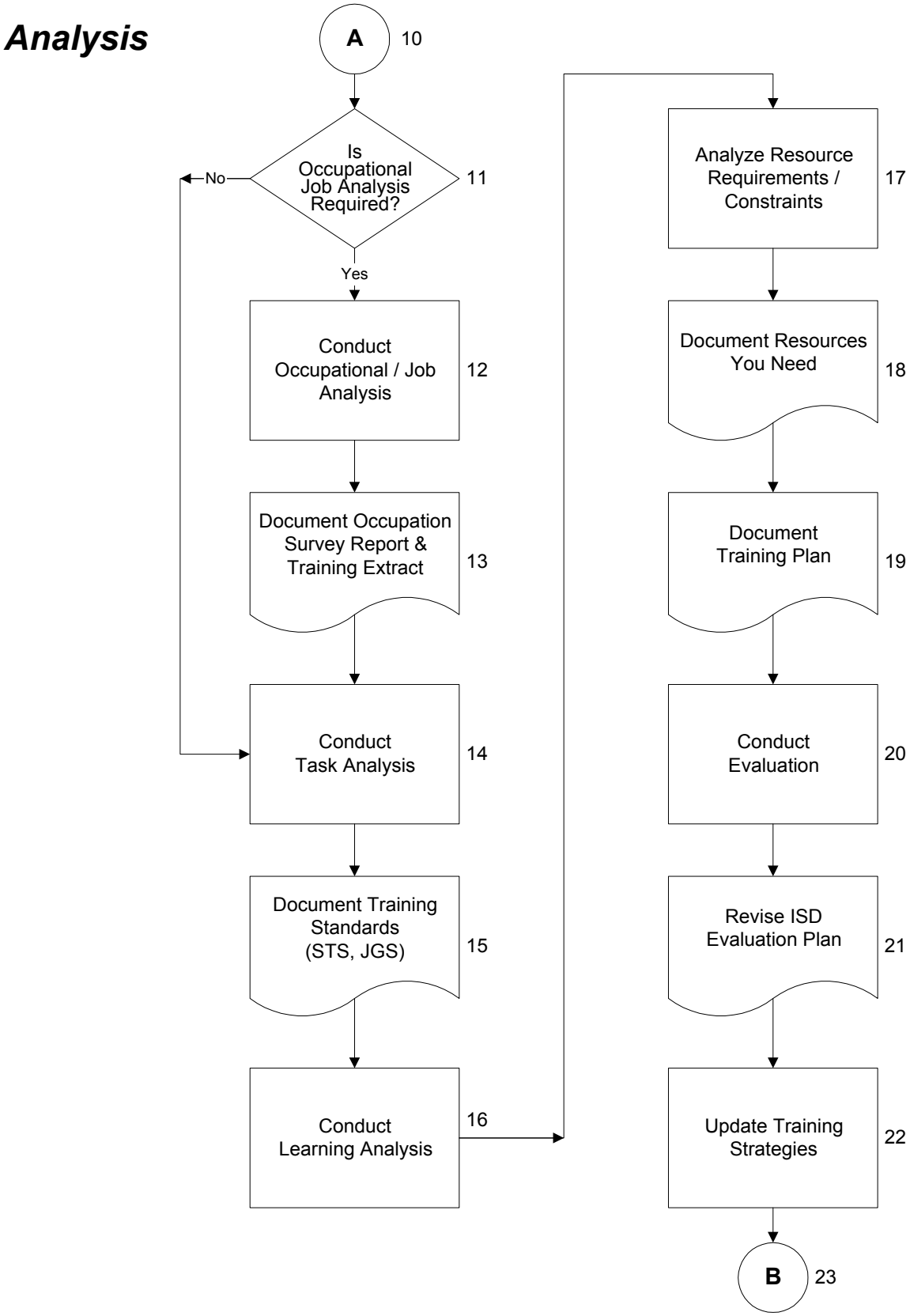


Figure 7 Training Development Flowchart (Part 3)

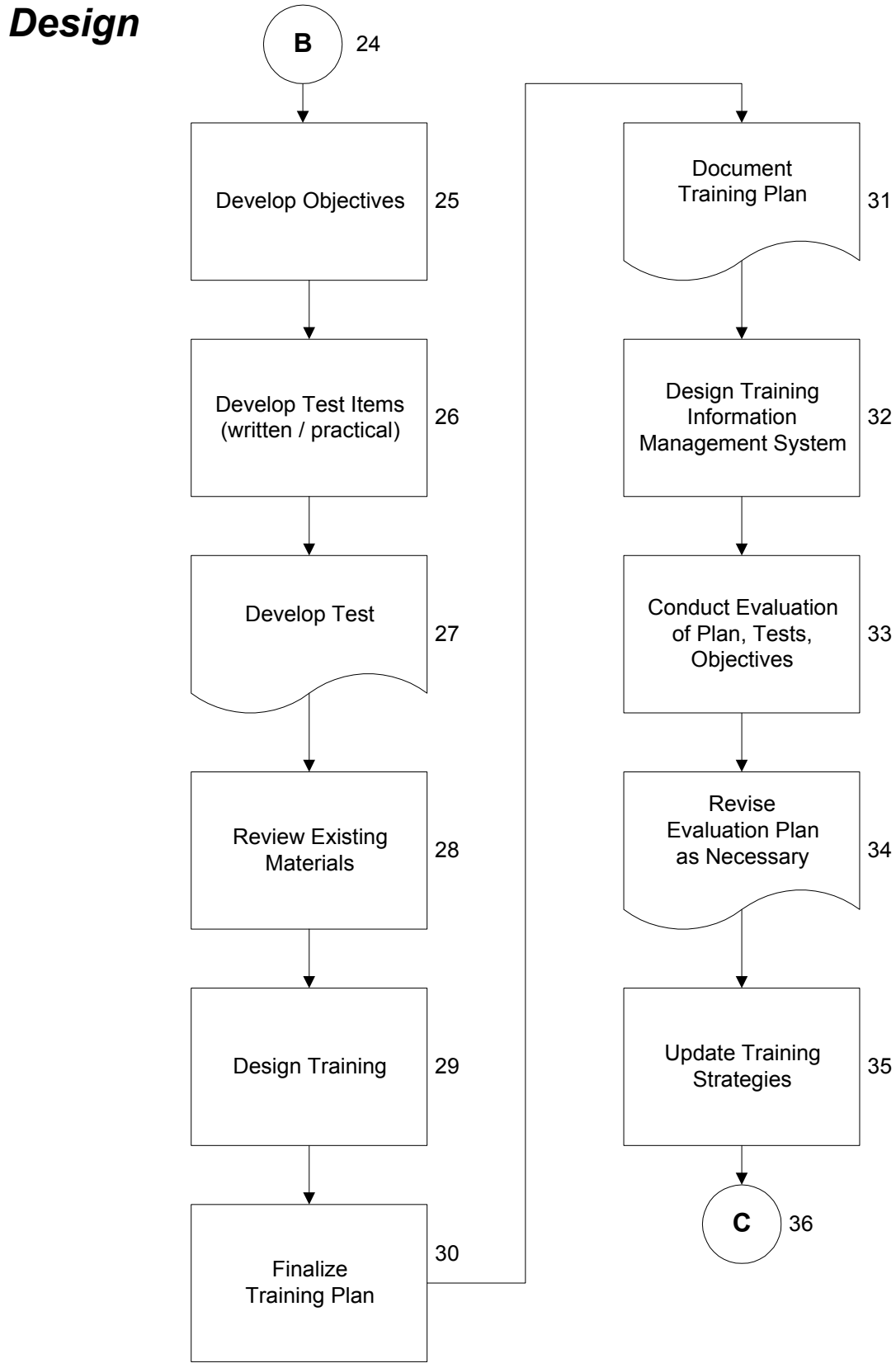


Figure 7 Training Development Flowchart (Part 4)

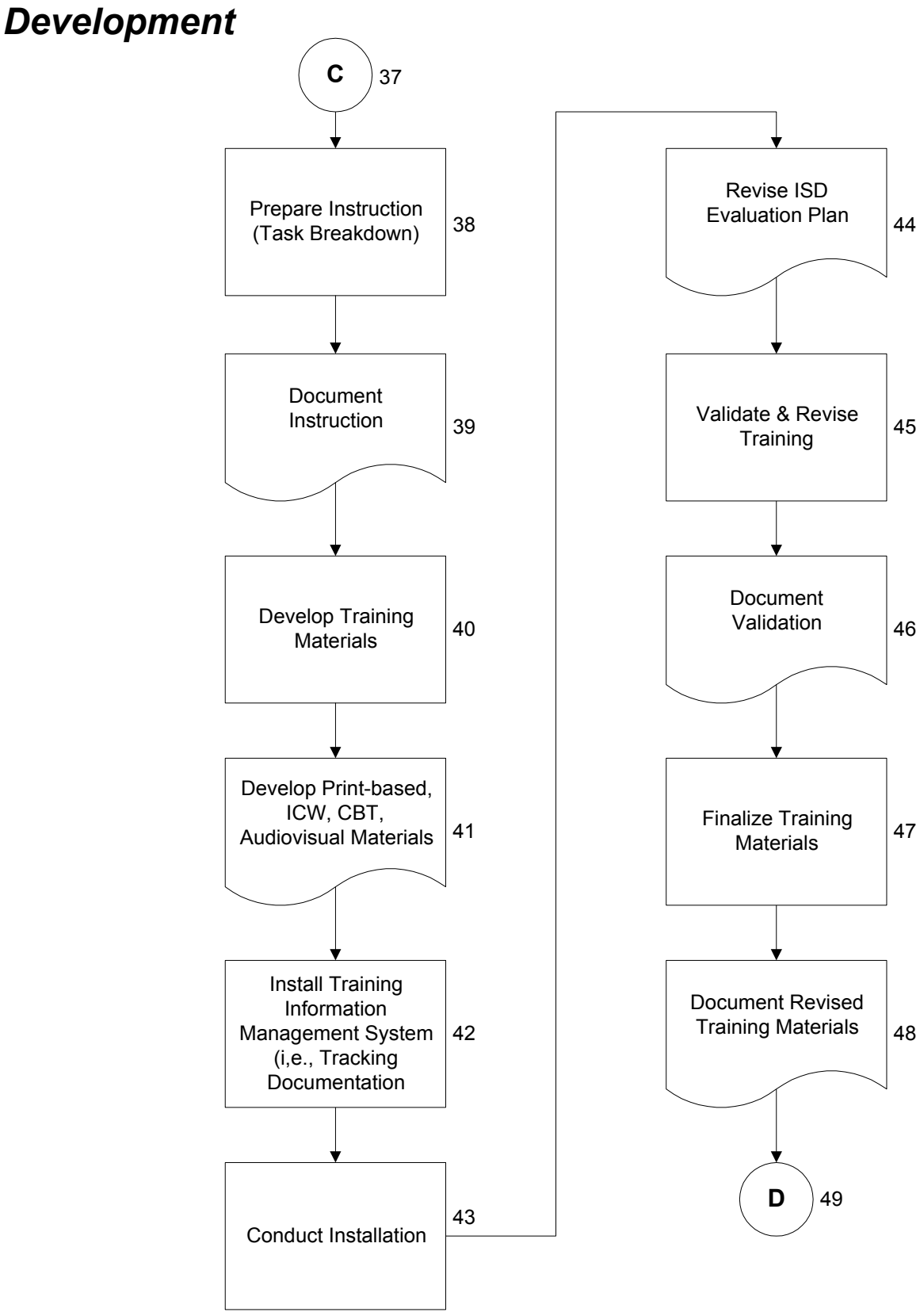
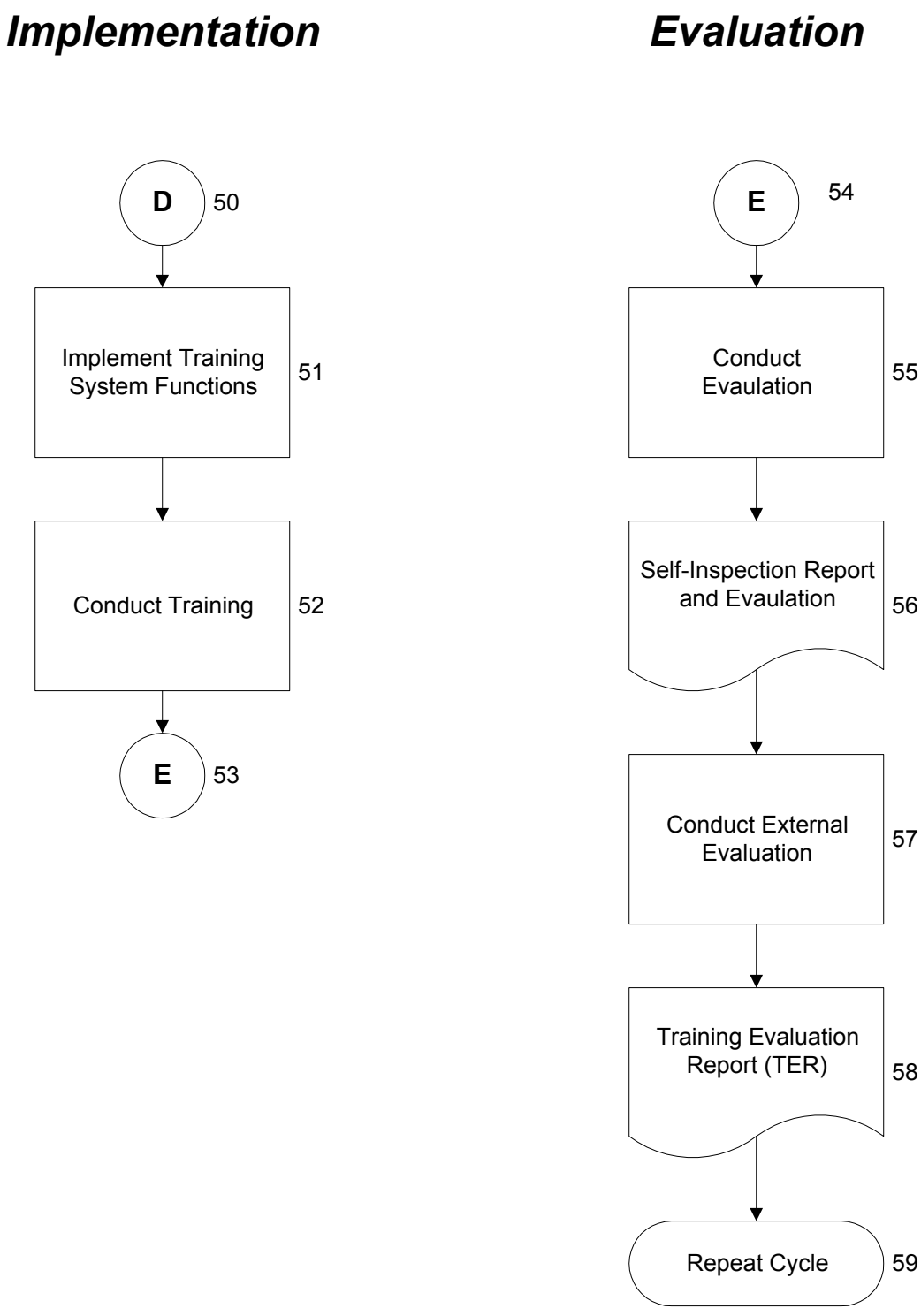


Figure 7 Training Development Flowchart (Part 5)



Metrics

Metrics are standards of measurement of quality indicators that are critical to maintaining quality in the training development process. The purpose of metrics is to provide qualitative and quantitative evaluations of the process and products within each phase of ISD. Metrics are based on key factors such as performance, cost, and schedule. Types of metrics include, but are not limited to, items such as:

Qualitative
- Directives
- Evaluation criteria
- Subject matter expert (SME) review
- Format guide

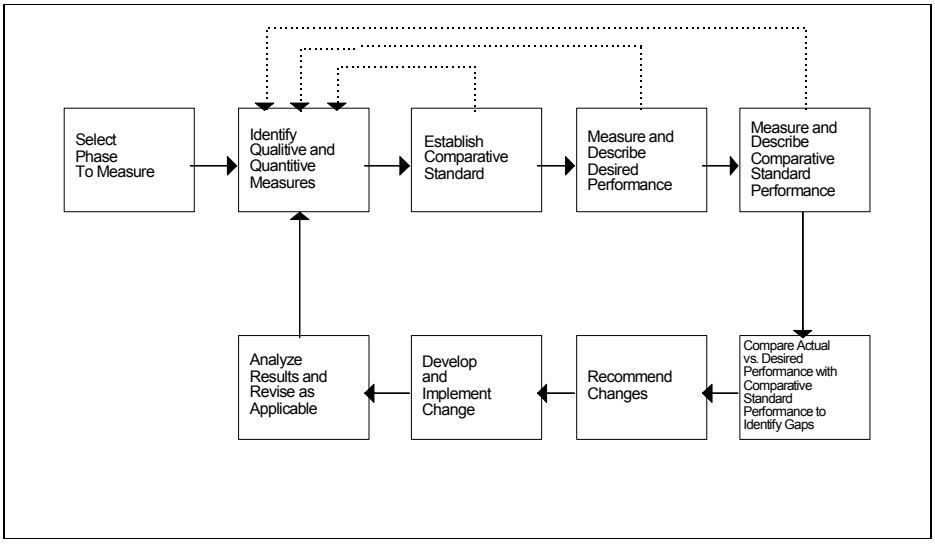
Quantitative
- Personnel/skill allocation
- Schedule

Test and evaluation data

Training system metric process

Figure 8 depicts a typical metric process that can be used to develop and measure unit training or OJT. It can be modified to meet unique and specific needs of the unit.

Figure 8 Feedback



Chapter 3
PLANNING

Overview

Introduction

Effective, cost-efficient **unit level training** does not just happen—it must be **planned.** Adequate planning is a key element in the management of the overall training system as well as the instructional system development (ISD) process itself. Although not a part of the actual ISD process, adequate planning should take place prior to starting the process.

It is the responsibility of unit-level managers, supervisors, trainers, and instructional developers to do adequate planning prior to designing, developing, implementing, and evaluating unit-level training. To ensure that training courses and programs are successful, all those in the unit who are involved in training should do their part to ensure that adequate planning has taken place before training design starts.

Objectives

The objectives of this chapter are to:
- Identify roles and responsibilities.
- Discuss tasking to develop training.
- Describe training needs.
- Describe training system requirements.
- Identify resource requirements.
- Explain evaluation plans.

Where to read about it

This chapter contains six sections.

Additional information

For additional information on planning, see:

AFMAN 36-2234, Instructional System Development.
Knirk, F. G. and Gustafson, K. L. (1986). *Instructional Technology: A Systematic Approach to Education.* New York: Holt, Rinehart, and Wilson.
Rossett, A. (1987). *Training Needs Assessment*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Section A
Identify Roles and Responsibilities

Introduction

Determining the roles and responsibilities of individuals involved in **unit training** programs is a key factor in preparing to apply the ISD process to unit training. In this stage of planning, the roles and responsibilities of individuals involved in the unit training programs are identified. For example, the roles and responsibilities of the commander, training managers, supervisors, trainers, instructional developers, and trainees are identified. For unit training programs to be effective and cost-efficient, individuals involved in the training programs must understand their roles and responsibilities so they can successfully carry them out in support of a quality unit training program.

Purpose

The purpose of determining the roles and responsibilities of individuals involved in the planning, design, development, implementation, evaluation, and management of unit training is to ensure that individuals are aware of the tasks they are responsible for and the role they play as members of the unit training team.

Who is responsible?

If a team is used to develop unit training programs, the team is normally responsible for ensuring that each individual's role and responsibilities are clearly defined. Existing Air Force policy directives such as AFPD 36-22 also prescribe many of the roles and responsibilities at the unit training level.

When are roles and responsibilities determined?

Determining the roles and responsibilities of the individuals involved in the unit training process is one of the first stages, if not the first, in the initial ISD planning for the unit training. This task should be accomplished as early as possible to ensure that individuals clearly understand their role and responsibilities as members of the unit training team responsible for unit training programs. Squadron Commanders can often help define the roles, if you provided them with the appropriate information.

What is required?

In order to determine roles and responsibilities, several tasks should be performed which include, but are not limited to, the following:

Determine the scope and level of the unit training project.
Identify the unit training team members such as supervisors, trainers, instructional developers, and subject matter experts (SME).
Define the role and responsibility of each team member.

These tasks are further described in this section.

Scope and level of the project

The scope and level of the unit training projects will determine the individuals required to "work the project" to ensure that a cost-efficient, quality training program is developed in a timely manner. For example:

Developing a new unit training course or an on-the-job training (OJT) program for a new defense system will normally require more individuals with different skills than revising an existing course or program.
Developing a new unit training course using multimedia will require personnel using different skills than are required to develop a structured on-the-job training (SOJT) handbook.
Levels of complexity within interactive courseware (ICW) will impact the number of skills required to develop a training program.
Some members will be in the squadron; with additional outside help being required as the complexity of the project increases.

Early in the planning stages, the exact scope and level required to develop a unit training program may be clearly definable. However, in the later phase of the ISD process, the scope and level of the training project will be defined, allowing the personnel required to be actively involved in the project to be identified.

Identifying unit training team members

Once the scope and level of the project have been defined, the individuals needed to plan, design, develop, implement, evaluate, and manage the training can be identified.

When identifying individuals, remember to identify team members such as:

Managers for the unit training program being developed or revised.
Supervisors who will supervise the training program once it is developed.
Trainers who will conduct the training.
Instructional developers who will develop the training program.
Subject matter experts (SME) to provide technical content.
Evaluators who will evaluate the training.

Identification of the team members should be done as soon as possible to ensure there is sufficient time for the team to develop a quality training program that meets the users' needs in a timely manner.

Defining roles and responsibilities

Once the team members have been identified, their role and responsibilities for the specific unit training project should be clearly defined. Clearly defined roles and responsibilities will:

Allow individuals to know their roles as members of the unit training team.
Identify who is responsible for performing each task in the ISD process.

It should be noted that it may not be possible to identify all of the responsibilities for each individual team member until after the training design has been completed.

Section B
Receive Training Development Tasking

Introduction

A tasking may be received from the unit commander to develop a new course for handling toxic waste or a new on-the-job training (OJT) program to provide training on a new ground power unit. Taskings such as these, as well as others, are normally the source or starting point for developing or revising training courses or programs. This section will discuss some of the tasking that may result in unit training development efforts.

What is tasking?

Tasking is any formal request to develop or revise unit training courses or OJT programs.

Who issues tasking?

Tasking to develop training may come from a number of different organizations or levels within the organization. Formal tasking will normally flow through predetermined channels depending on the level and source of its origin.

The following are examples of different levels from which tasking may be issued:

Functional Managers – Air Staff (HQ USAF)
Functional Managers – Major Command (MAJCOM)
Group Commanders – Base
Unit Commanders – Base

Sources of tasking

Tasking to develop training may come from any number of sources. Examples are:

External

Air Force Policy Directives
Utilization and Training Workshops (U&TW)
Training Planning Teams (TPT)
Training Quality Reports (TQR)
Training Evaluation Reports (TER)
New Defense Systems
Internal
Self-inspection
Student critique
Evaluations

Who is responsible?

The unit training development team has the responsibility for:

- Planning for adequate unit training courses and on-the-job training programs.
- Designing, developing, implementing, and evaluating the training.
- Ensuring the quality of the ISD process and the products of each of the processes within the ISD process.
- Responding to the user's needs.

Training need

Remember, the ISD process starts with a training need. It normally comes to the training team in the form of a formal request to develop or revise unit training courses or OJT programs.

Section C
Determine Training Needed To Meet Requirements

Introduction

At this point in the ISD planning process, training needed to meet the user's requirements should be determined. Early in the planning stages, adequate preparations will help ensure that training is designed and developed to meet the unit's established training requirements.

Purpose

The purpose for determining the training needed to meet the requirements of the training system is to identify the types of training required, such as new performance skills, knowledge, and attitudes to maintain and support a new defense system. Early identification of needed training will enable the training development team to more accurately design, develop, and implement training systems based on the effect training will have on training system components such as equipment, facilities, time, personnel, media, and methods.

Who is responsible?

The unit training development team is responsible for determining the training needed to meet the user's training requirements and the system requirements.

When should it be done?

Determining the needed training to meet the system training requirements should be done early during the initial planning stages of the instructional system development (ISD) project. The training requirements should be determined prior to making preliminary decisions such as the media and methods that should be used and the possible training alternatives.

How should it be done?

During the initial planning for the ISD project, it may not be possible to identify all of the training needed to field a training system. For example, as a new or revised training system begins to take shape the training requirements will be more easily identified. The same is true when new policy directives require new unit training courses. Often the courses and their content cannot be determined until more is known about the directive and any additional guidance that might be provided by subordinate units.

There are several ways to initially identify the training that may be needed to meet the user's training requirements. Some of the methods are:

Compare the on-the-job training (OJT) programs developed for one defense system or an Air Force Specialty (AFS) to see if any of the lessons learned, methods, media, materials, or content can be used in the training to be designed and developed.
Review existing DoD and Air Force sources such as catalogs to determine if training already exists that could be used or revised to meet the training requirements.
Check DoD and Air Force directives to determine if they require specific training to a specified level to meet the requirements.
Use the experience of the unit training team members to identify possible training requirements and to improve the training development process and the quality of the products.

Section D
Determine Training System Requirements

Introduction

Prior to applying the ISD process to developing unit training or OJT, some initial planning will need to be done to set the stage for the development process. Part of the initial planning is to determine the new or revised training requirements of the unit. Since the requirements identified in the planning stage are preliminary, they may need to be revised or updated as unit training requirements change, defense systems are fielded, and new OJT requirements are established. Determining the training system requirements within a unit is a continuous process since requirements are always changing and existing training courses and programs need to be constantly improved.

Purpose

The purpose of identifying the requirements for unit training and OJT is to establish a "framework" for building an effective, cost-efficient unit training system.

Who is responsible?

Determining the overall unit training system requirement is a responsibility of unit management. However, the specifics of a particular unit training course or OJT program are the responsibility of the unit training development team tasked with the responsibility for designing and developing the training.

When should it be done?

Determining unit training requirements is a continuous process, which is determined by the changes or activities within a unit. However, each major change or activity such as a new defense system, new computer equipment, or new policies and procedures will require a determination of the new or revised training requirements, how they fit in the overall training system, and their impact on current training programs.

What should be determined?

Determining the training system requirements within the unit includes:

Assessing technology and methodology. This includes looking at the technology that is available in the unit or can be obtained within the unit. It also includes a look at new methodology or procedures in order to determine how they might be used to meet training requirements within the unit.

Making preliminary methods and media selection. The preliminary selection of methods and media is the "best guess" as to what may be the best way to provide the training such as ICW, job aids, classroom lecture, SOJT guides, etc. Making the preliminary decisions allows further planning and design activities to be processed, such as determining possible training alternatives.

Examining training alternatives. This includes looking at the anticipated training system requirements within the unit and selecting alternative methods of providing the training in the event the primary training delivery system is not available. For example, the primary equipment for training a particular OJT task may be a part-task trainer. However, the alternative equipment for training that task is the actual aircraft.

Section E
Identify Resource Requirements

Introduction

One of the most critical elements in unit training is resources. Throughout the entire instructional system development (ISD) process, resources will be a major concern. Each individual who plays an active role in unit training has a responsibility for resources. In the planning stages for the ISD process, identification of the needed resources must begin. Resources are required to plan, design, develop, implement, evaluate, and manage unit training courses and OJT programs.

What is a resource?

Resources in this handbook refers to:

Equipment – training, support, spare.
Facilities – classrooms, phase dock, laboratory, test stations.
Human Resources – instructional developers, trainers, students.
Money – equipment, facilities and personnel cost.
Time – training development, personnel, training equipment.

Who has initial responsibility?

Although each individual involved in unit training has a resource responsibility, commanders and managers have the initial responsibility. During the planning stages of developing or revising unit training courses or OJT programs, they have the overall responsibility for ensuring that the types and amounts of resources are identified and are available to support the training requirements.

When identifying resources required to support training, consider the following questions:

Sample Questions for Identifying Resources
Equipment
What and how much training equipment is needed?
What and how much support equipment will be needed?
What and how many spares will be needed?
Are there any equipment constraints? If so, what are they?

Who has initial responsibility? (Continued)

Facilities What type of facilities will be needed to conduct or support training? Will new facilities such as a classroom be required? If existing facilities are used, will they require modification? Are there any facility constraints? If so, what are they?
Human Resources How many instructional developers will be needed? How many trainers will be needed? Will subject matter experts be required? Will task certifiers be required? How many students will need to be trained each year? Are there any personnel constraints? If so, what are they?
Funds How much will it cost to design, develop, and implement training? How much will it cost to support, operate, and maintain the training? Are any funds specifically marked for training? Are there any funding constraints? If so, what are they?
Time Are the identified training requirements current? How long will it take to design and develop the training? How long will the training course be? Do students have sufficient time to attend the training? How soon must trainees be proficient? Are there any time constraints?

Revising initial requirements

During the planning stage, it may not be possible for the training development team to identify all of the resources needed to develop or revise a unit training course or OJT program. However, later in the design and development phase of the process the team will be able to more clearly identify the type and amount of resources needed for an effective, quality training course or program.

Sources of identifying resources

In order for the unit training development team to identify the required resources, many sources of information will have to be used. Some of the sources that can be used to identify the needed resources are:

Documentation
- Unit manning documents.
- Training standards.
- Master task list (MTL).
- Policy directives.
- Technical data.
- Mission statements.
- Unit training requirements.
- Existing courses and programs.

Personnel and Equipment
- Subject matter experts (SME).
- System requirements.
- System specifications.
- Operating instructions.
- Similar systems.

Availability of resources

Resource availability is critical to the design, development, implementation, evaluation, and management of effective, quality unit training courses and OJT programs. Adequate resources must be available when they are needed.

Early identification of needed resources helps ensure that the resource is available when needed.

For example, some training may require:

- More than two years to get a part-task trainer to train a specific task.
- One year or more to get an instructional developer or computer programmer.
- Three or more years to have a facility built.
- Four or five years for the budget process.

How to deal with resource constraints

Those involved in unit training and OJT will likely always be faced with some type of resource constraint. Seldom will all of the needed resources be available. The table below suggests some alternatives for working around resource constraints.

Resource Constraints and Possible Alternatives
Equipment Borrow equipment from another unit or squadron. Share equipment with other units or squadrons. Build part-task trainers rather than using the actual equipment. Use the equipment on more than one shift. Use larger group sizes on the equipment. Use other delivery methods and media to overcome equipment problems.
Facilities Use temporary facilities. Operate multiple shifts. Share facilities with other units or squadrons. Use different delivery methods and media.
Human Resources Use trainers from other units and squadrons. Borrow instructional developers from other units and squadrons. Increase student group size. Reduce training time. Use different delivery methods and media.
Funds Use desktop simulators rather than full simulators. Increase the number of students taught at one time. Borrow equipment and facilities rather than buying or building. Select less expensive delivery methods and media.
Time Use additional personnel to design and develop the training. Design and implement a shorter version of the training. Use different delivery methods and media. Work overtime.

How to deal with resource constraints (Continued)

Ensure that work-arounds to resource constraints are acceptable to those who have overall management responsibility for the training courses and programs. It should be noted that work-arounds are temporary in nature and a permanent resource solution must be sought.

Section F
Develop Evaluation Plan

Introduction

Instructional system development (ISD) is a total quality process, which ensures that training courses and programs developed using the process are both effective and cost-efficient and produce students who have the skills, knowledge, and attitudes needed to perform their jobs in the operational environment. To ensure quality, evaluation of the processes and products must begin in the planning stages of the ISD project and continue throughout the life cycle of the unit training course or OJT program.

Purpose of the plan

The purpose of the evaluation plan is to provide an organized, structured plan for evaluating the ISD process and products to ensure that quality unit training courses and OJT programs are designed, developed, and implemented at the unit level.

Why have a plan?

An evaluation plan is a guide for establishing "what" and "how" unit training courses and OJT programs will be evaluated during the design and development process as well as for the life cycle of the training to ensure total quality.

Who is responsible?

Management at the unit level has the overall responsibility for ensuring that a plan is developed for evaluating training. However, the task of developing a plan is normally done by the unit training development team.

When is a plan needed?

The training development team should consider developing an evaluation plan when new courses or OJT programs are developed or major revisions are to be made to existing courses or programs. However, the team will have to decide when it is appropriate to develop an evaluation plan. It should be noted that existing evaluation plans may be used with little or no modification.

Format of the plan

The format of evaluation plans will be determined by the unit responsible for developing and managing the training, unless the MAJCOM has specific requirements. The content of the evaluation plan is flexible and will depend to a great degree on the nature and scope of the training being developed or revised. In all cases the plan should contain no more nor less information than is necessary to document how the training development process and products will be evaluated. The plan should cover all phases of the evaluation process including:

Formative evaluation.
Summative evaluation.
Operational evaluation.

Remember, the evaluation plan can be as simple as a one-page document, if that is all that is needed to describe the evaluation process for training being developed or revised.

What is in the plan

The evaluation plan should include information sufficient to ensure that the ISD process results in total quality in both process and products. The plan may include, but not be limited to, the following information:

Purpose and scope of the evaluation.
Identification of responsibilities.
Identification of tasks involved in the evaluation process.
How and when the evaluation activities are to be accomplished.
Documentation and report requirements.

The unit may establish requirements to include other information in the evaluation plan as deemed appropriate for the specific training development project.

Chapter 4
ANALYSIS

Overview

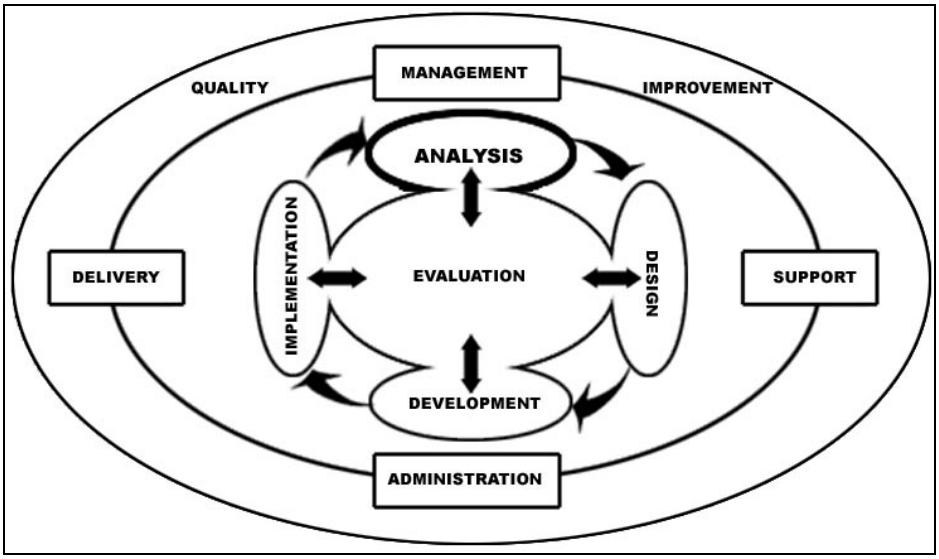
Introduction

The analysis process provides the information needed to design, develop, and implement effective, cost-efficient training programs, which meet individual as well as work center needs. The basic concept is to determine the task requirements of the work center, and match those requirements against the skills and knowledge of the individuals assigned to the work center.

Where are you in the process?

In order to help visualize the relationship between the analysis process and the rest of the Instructional System Development (ISD) process, an ISD model with the analysis phase highlighted is shown in Figure 9.

Figure 9 Analysis Phase



Objectives

The objectives of this chapter are to:

Describe the work center.
Discuss duty positions.
Identify training requirements.

Where to read about it

This chapter contains seven sections.

Additional information

For additional information on analysis, see:

AFMAN 36-2234, Instructional System Development.
Carlisle, K. E. (1986). *Analyzing Jobs and Tasks*. Englewood Cliffs, New Jersey: Educational Technology Publications.
Wolfe, P., Wetzel, M., Harris, G., Mazour, T. and Riplinger, J. (1991). *Job Task Analysis: Guide to Good Practice*. Englewood Cliffs, New Jersey: Educational Technology Publications.
Zemke, R. and Kramlinger, T. (1982). *Figuring Things Out: A Trainer's Guide to Needs and Task Analysis*. Reading, Massachusetts: Addison-Wesley Publishing Co., Inc.

Section A
Define Work Center Mission

Introduction

You know your job. You have been doing it a long time and you are one of the best at it—otherwise you would not be the supervisor. However, take a step back for a moment and rethink your mission—your purpose, products, and customers.

What to define

The three parts of the work center mission that should be defined during the analysis phase are listed in the table below.

Mission Part	Defining Questions
Purpose	Why does the work center exist? How does the work center fit into the organization? What are the work center's responsibilities?
Products	What does the work center produce? What services does the work center provide?
Customers	What are the benefits of the work center's activities? Who uses the work center's products or services? What does the customer do with the work center's products or services?

How to use it

Questions such as these will help define the work center's mission. Once the work center's mission has been defined, the work to be accomplished in the work center can be identified and verified. By assessing what should be going on in the work center and comparing it to what is actually going on, supervisors or the development team can determine what and when training is needed. Providing the appropriate training at the right time to the work force helps ensure mission accomplishment.

Section B
Identify Work Center Tasks

Introduction

Work center tasks form the basis for all required unit training. It is important that curriculum developers or the development team not only identify the tasks actually being performed in the work center but also the tasks to be performed. This form of mission analysis is most often referred to as training needs assessment (TNA). The difference between "what should be" and "what actually is" determines what should be trained. Once it has been determined what should be trained, the work center tasks can be identified.

Sources of information

There are many sources of information that can be used to identify work center tasks. Some of the most commonly used sources are:

Existing documents.
Interviews.
Questionnaires.

It is unlikely that one single source of information will always be better than another source. The scope and nature of the work center, operational environment, and the tasks involved will normally determine the source to use in identifying work center tasks. It is more likely that information from several sources will provide for better work center task identification.

Where to read about it

This section covers three sources of information.

Additional information

For additional information, see:

AFMAN 36-2234, Instructional System Development.
Rossett, A. (1987). *Training Needs Assessment*. Englewood Cliffs, New Jersey: Educational Technology Publications.
Be A Better Needs Analyst (1985). Training and Development (February), American Society For Training And Development.

Existing Documents

Introduction

There are many documents that will aid in identifying the tasks required to be performed in a work center. The information provided below provides an overview of some of these documents. Other documents may be used depending on their availability and suitability for identifying tasks in a specific work center.

Specialty training standard

The Specialty Training Standard (STS) lists those tasks applicable to an entire Air Force Specialty. It specifies what is taught in the resident technical schools and career development courses (CDC), and to what level of performance. However, training on the job is often more specific and extensive. The STS should be analyzed and those areas or tasks performed in the work center should be identified. It is not likely that all tasks listed in the STS will be performed by any one given work center.

Career field education and training plan

When researching specialties that have a Career Field Education and Training Plan (CFETP), ensure that the document is reviewed carefully. The first section of the document lists the education and training plan requirements for the specialty and specifies the points in an individual's career at which the education and training should be provided. The second section contains the STS. The core tasks for the specialty and the job types are identified in the CFETP. Also, in some plans the minimum upgrade requirements may be identified. As CFETPs are developed for each Air Force Specialty, training managers and supervisors will be required to do less analysis at the unit level since the plans will identify the unit training requirements.

NOTE: If a CFETP is available, it must be used.

Air Force job qualification standards

An Air Force Job Qualification Standard (AFJQS) is a comprehensive task list prepared by Air Force career field managers for a particular job type, duty position, or defense system. There may be several AFJQSs for a given Air Force Specialty. The tasks listed in an AFJQS are common to all individuals working in a particular duty position. The AFJQS helps standardize upgrade and qualification training because it identifies the minimum tasks individuals must be qualified to perform. A listing of the available AFJQSs can be found in AFIND 8.

NOTE: An AFJQS will be included as part of the CFETP. It must be used in lieu of the STS for individuals assigned to the specific duty position or piece of equipment for which the AFJQS was developed.

Command job qualification standards

The Command Job Qualification Standard (CJQS) was developed to list tasks specific to a Major Air Command (MAJCOM) job type, duty position, or defense system. Each command has different procedures for developing CJQSs; some may be organized by duty positions, and some may be organized similar to the STS. CJQSs often include command-specific upgrade requirements for both 5-skill level and 7-skill level. Many also identify "critical tasks." The CJQS is used in conjunction with an STS or AFJQS unless it has been approved as a "stand-alone" document by the Air Force career field manager.

Other documents

Several other documents can also be reviewed by the development team in order to identify the tasks to be performed in the work center. These include documents such as policy directives, manuals, handbooks, and technical orders. The development team can also use military and civilian position descriptions and base operation plans. Remember to look for tasks that may be out of the ordinary or tasks not often performed.

Summary

Many of the existing documents that may be useful are summarized in the following table:

Source Document	Information Found
Specialty Training Standard Air Force JQS	Career field tasks Career field training requirements
Command JQS	Duty position training requirements
Career Field Education and Training Plan	Specialty Training Plan Specialty Training Standard Career field core tasks
Handbooks Technical Orders	Tasks Procedures
AFI 36-2108 AFI 36-2105	Mandatory duty requirements
Management Engineering Team Reports	Work center duties and tasks
Civilian position descriptions	Civilian duty requirements
Operations Plans	Wartime or special mission tasks
IMA management folders	IMA duties and tasks
Staff Assistance Reports IG Reports	Mission accomplishment analysis
Master Task List	Work center tasks
Task Breakdown	Procedures

Interviews

Introduction

Training managers or new supervisors may not have detailed information about the work center. One of the best sources of information regarding a work center or duty position is the subject matter experts (SMEs), such as maintenance supervisors and section/branch chiefs. An SME is someone who has field expertise and recent job experience, and is familiar with the training systems being used for the job or duty. Interviewing SMEs is an excellent method to identify work center tasks.

Selecting SMEs

SME selection ultimately depends on the information required. Contact supervisors and other knowledgeable individuals in the work center. Next, determine approximately how many SMEs to interview. The more SMEs interviewed, the more comprehensive and valid the analysis will be. Also, the number of different Air Force Specialties in a work center will affect how many experts will need to be interviewed.

What to look for

Look for tasks currently being performed in the work center and those that should be performed but are not yet identified. Search for any special, recurring, wartime, or local tasks.

Ask about the details of the tasks. Details to look for include:

Equipment needed.
Tools needed.
Mission priority.
How critical the task is?
How many people perform the task?
How often the task is performed?
Minimum standard of performance (what determines the go/no go level).

Another area the development team may want to focus on is how the tasks can be broken down into duty positions within the work center. The organization of the specialty or work center may lead to different job types and/or functional groupings of tasks.

Interview guidelines

Some general guidelines for conducting an interview are:

Have any research material available for reference during the interview.
Ensure that questions pertain to a particular task. This will help focus the SMEs on the tasks and prevent confusion.
Consider providing SMEs with a list of the task questions so they can prepare for the interview.
Communicate at a level that promotes understanding and mutual respect.
Speak clearly, distinctly, and with enough force to be heard and understood.
When sitting in a chair, sit upright; don't slouch down in the chair. Slouching conveys an "I don't care" attitude and the interviewees may believe their time is being wasted.
Look at the individuals when asking questions.
After asking the question, listen to the response. Don't interrupt.
Conclude the interview at the agreed time and thank the SME for the input given. If the interview has not concluded, find out when the individual will be available to finish.

Questionnaires

Introduction

Another way to gather information on work center tasks is with a questionnaire. This may help determine the details about the task and can prove useful when trying to reach large numbers of SMEs. There is no set format for a questionnaire. The questions asked are determined by the information needed. If a questionnaire exists that meets your needs, it may be used. Questionnaires contain three sections: instructions, background information sheet, and questions. Each of these is discussed below.

Instructions

Respondents cannot effectively complete a questionnaire unless they understand what is required of them. Therefore, instructions need to be clear and concise, and identify what should be done to complete the questionnaire. Also, the instructions should explain the reasons for the questionnaire and how the respondent's information will be used.

Background information sheet

The background information sheet helps determine who does what in the work center. When determining the different duty position tasks, ask what duty position the respondent occupies. Also, find out information such as the skill level of the respondent, how long they have been in the AFS, and job title. Do not ask for personal information.

Questions

In order to obtain the necessary information about work center tasks, the right questions should be asked and the right format should be used. The two basic types of questions normally used in a questionnaire are closed-end and open-end. Many questionnaires will use a combination of these two types of questions to confirm the tasks already identified by duty position or tasks missed during the initial research process. Additional information on the two types of questions normally used on questionnaires is provided below.

Closed-end Questions

Use closed-end questions when knowledge of the basic tasks performed in a work center exists, but not a duty position. Closed-end questions give the respondent a small number of choices to make, such as answering "yes" or "no" to a question, or selecting "a," "b," or "c" as the answer.

Open-end Questions

Use open-end questions if it is uncertain as to whether all work center tasks have been identified. This type of question allows the respondent to write in their own information about what tasks they do on the job.

Section C
Develop/Update Master Task Listing

Introduction

At this point, the development team should select those tasks actually performed in the work center. The development team should remember that most of the existing task listings are written at a fairly global level. Thus, a determination must be made as to which tasks in the listing apply to the specific mission and work center. The listing of work center tasks is called a Master Task Listing (MTL).

Advantages of an MTL

There are several advantages to developing an MTL. Some of the advantages are:

All work center task requirements are listed in one place.
The requirements do not have to be memorized.
Program continuity is aided by allowing others to know what the work center requirements are.
The MTL can be broken down to show what tasks and skill levels are required for specific duty positions.

Documenting an MTL

There are several methods used to document an MTL for the work center. Examples of some of the more popular ones are given below. To be effective and useful, an MTL should be easy to use. The key is to keep it simple.

NOTE: MAJCOM career field managers or base training managers may have specific procedures for developing an MTL.

Example 1: Tailored STS

An MTL can be created by circling tasks in an STS or CJQS.

Example 2: CFETP

Use a CFETP for identifying all core tasks and work center tasks.

Example 3: Tailored AFJQS

Since an AFJQS is organized by duty position, it is easier to cross off items that do not apply to the work center.

Example 4: Training chart

A quick reference-training chart can be made from an MTL by consolidating the applicable information from an existing MTL onto a training chart.

Example 5: Homemade list

The development team can develop an MTL to meet the needs of the work center.

Section D
Define Work Center Duty Position

Introduction

The next activity in the unit training analysis process is to define the duty positions within the work center. The duty positions, together with the work center tasks, form the basis for defining the specific training requirements.

Guideline

The development team needs to ensure that 100 percent of the mission requirements are covered. One hundred percent coverage means enough people will be assigned tasks as part of their duty position to meet mission and customer requirements. One hundred percent coverage does not mean every person in the work center must be trained and qualified to perform every work center task. For example, the tasks performed by all individuals assigned to the work center should cover all of the work center tasks. This includes critical tasks, high volume tasks, and needed backup coverage.

Exception

One hundred percent task coverage does not mean every person in the work center must be trained and qualified to perform every work center task.

Determining duty positions

The steps required to determine duty positions within a work center are fairly straightforward.

Step	Action
1	Review the Master Task List (MTL).
2	Eliminate tasks that will be performed by all personnel. Note: These tasks become part of all duty positions.
3	Group remaining tasks by any or all of the following: Function. AFSC requirements. Job type. Skill level requirements.

Documenting duty positions

If an MTL is used to document work center tasks, it can also be used to identify duty positions within the work center. Annotate the MTL to show the breakdown of the duty positions by task. This can be done with symbols, numbers, or highlighter on any type of task list. Also, a separate list can be made by duty position, or mark a JQS for each duty position. It may be best to develop a separate MTL for each duty position.

Section E
Perform Initial Skills Evaluations

Introduction

Once all the work center tasks have been identified, the development team can begin to define the specific training requirements. In its simplest form, training requirements are the tasks that individual members of the work center cannot perform. Initial skills evaluations help identify which tasks the members can and cannot perform. Initial evaluations are normally conducted on newly assigned personnel or new trainees.

Evaluating new personnel

Evaluate formal school graduates to determine the effectiveness of the training they received. Remember, the graduate was not trained to the "Go/No Go" standard. Expecting the trainee to perform to the local qualification standard (Go/No Go) will not provide a true picture of what the trainee has learned in the formal school. For example, the performance standards taught in the school may not meet the performance standards of the unit.

Evaluation criteria: New personnel

To evaluate new personnel, use the appropriate STS and base the assessment on the proficiency codes listed in the 3-skill level column. Determining the effectiveness of training will help define what training is needed so the graduate can perform to the established standards.

Evaluating experienced personnel

Generally, individuals who transfer into a work center from another base or work center have some experience in the AFS, and a skill level commensurate with the grade. Start by reviewing the member's training record to determine what training they have received or what tasks the individual is qualified to do. To determine actual performance level, observe the individual doing the tasks. Also, a series of questions can be asked, usually during the initial interview, which starts the process, to help determine task knowledge, background, and other related knowledge.

Evaluation criteria: Experienced personnel	Conduct the evaluations using both the work center task standards and procedures. Often it will be determined that the individual's performance simply does not meet the established standards for the task. It may be that the procedures and standards are different between the new work center and the previous work center.
Using evaluation results	The skills evaluations performed provide the information needed to complete the next two phases of the training requirements definition process. The list of skills that members of the work center can and cannot perform is critical to determining which duty positions will be filled by management. This list, together with the list of duty position requirements, defines the individual training requirements.

Section F
Determine Duty Positions

Introduction

Which duty position management fills is a balancing act between the needs and capabilities of the workers and the requirements of the work center.

Factors to consider

Key considerations in placing individuals into specific duty positions include:

Mandatory upgrade requirements.
Mandatory qualification requirements.
Career Field Education and Training Plan (CFETP) training requirements.
Existing or projected manpower constraints.
Number and types of personnel assigned to the work center.
Projected personnel gains and losses.
Job rotation requirements or capabilities.
Whether the work force is challenged.

Section G
Define Training Requirements

Introduction

Once it has been decided what an individual will do (determined by the duty position), it becomes a matter of comparing their skills to the job requirements to determine what training is needed. Based on the skills evaluations, if an individual is qualified on a task, no further action is required. If not qualified and certified, decertify the individual on those tasks (if appropriate) and enter them into the appropriate qualification training. If tasks are required but the individual is not certified, qualification training should be started.

Individual training requirements

The tasks identified as requiring training for a given member of the work center become the individual training requirements. To help keep track of these training requirements, document the appropriate training standard for use as a Job Qualification Standard (JQS). Refer to AFI 36-2201 and the cover page of the training standard for documentation procedures.

Work center training requirements

In contrast to individual training requirements, work center training requirements are the sum total of all of the work center's training needs. The development team should make note of recurring training and training needed by all or most of the individuals in the work center (common requirements) for future reference. Chapter 3 provides information on satisfying those common training requirements.

Chapter 5
DESIGN

Overview

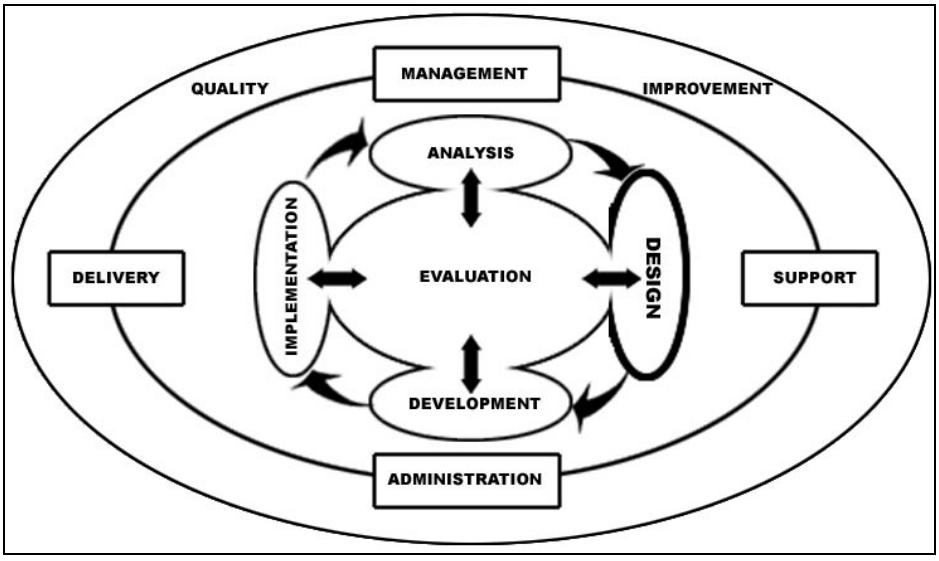
Introduction

Once the analysis phase of the Instructional System Development (ISD) process has been completed and the necessary analysis data has been collected, the training development team begins the design phase of the process. In the design phase the framework for the training system is built by determining the training objectives and designing the training. A major concern for the developers is the effectiveness and cost-efficiency of training design since it has a significant impact on the next phase of the ISD process, which is development. In this phase, as well as the other phases of the process, developers are also concerned about the quality of the design process and product.

Where are you in the process?

At this point in the ISD process, the developers are ready to enter the design phase. An ISD model with the design phase highlighted is provided in Figure 10 to help visualize the entire ISD process before beginning this phase.

Figure 10 Design Phase



Objectives

The objectives of this chapter are to:

Discuss the task analysis data.
Describe the training design.
Explain the quality improvement activities.

Where to read about it

This chapter contains eight sections.

Additional information

For additional information on designing training, see:

AFMAN 36-2234, Instructional System Development.
Briggs, L. J. and Wager, W. W. (1981). *Handbook of Procedures for the Design of Instruction* (2nd Ed.). Englewood Cliffs, New Jersey: Educational Technology Publications.
Dick, W. and Carey, L. *The Systematic Design of Instruction* (3rd Ed.). Glenview, Illinois: Harper Collins Publishers.
Gagné, R. M., Briggs, L. J., and Wager, W. W. (1992). *Principles of Instructional Design* (4th Ed.). New York: Harcourt Brace Jovanovich.

Section A
Expand and Update Task Analysis

Introduction

When the unit training requirements have been identified in the analysis process, the development team moves to the next phase of the ISD process, which is design. In this phase, the first activity is normally to expand and update the task analysis data. This section provides additional information on this activity.

Reasons for expanding and updating

There are two basic reasons for expanding and updating the task analysis data. The reasons are:

To make sure that all steps of the task have been identified.
To ensure that trainees are taught complete tasks.

Without a complete task breakdown, it is possible the trainers may miss some portion of a procedure because the task has become second nature to them. If omitted, it is unlikely the trainee will be able to complete the task satisfactorily.

At this point, if sufficient data was not gathered during the analysis phase, the development team should reenter the analysis process and follow the prescribed procedures for collecting additional data as necessary.

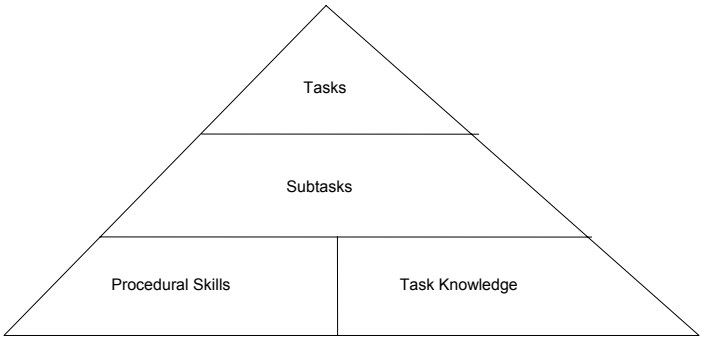
Expanding and updating analysis data

When researching the task analysis data, identify the following in the order they occur:

Steps (subtasks)
Procedural skills
Supporting knowledge (for each task)

Figure 11 graphically illustrates the relationship between the components of a task.

Figure 11 Task Breakdown Relationship



Data gathered at this point will be used to develop the objectives, evaluations and lesson plans. The recommended procedures for expanding and updating (breaking down) analysis data are:

Identify Subtasks

For each task, identify the steps (subtasks) required to perform each task. These steps serve as the basis for much of the later design activities. For example, identifying the subtasks enables the development team to focus on evaluation requirements and they can be used in the training program as major teaching steps.

Identify Procedural Skills

Procedural skills are actions required to perform a subtask such as reading a technical order (TO) or using tools or test equipment. There may be procedural skills needed to perform each subtask, or specific procedural skills required to perform several subtasks. Each task will vary in the breakdown of subtasks and related procedural skills.

Expanding and updating analysis data (Continued)

Identify Task Knowledge

This is the knowledge required to perform a subtask or procedural skill such as choosing the right TO, knowing which tool to use or how to operate test equipment. Critical knowledge, such as safety procedures, will need to be included in the training program.

Documenting task analysis

There are numerous ways to document the task information. The information may be documented or recorded by using a worksheet or form suitable for the purpose. The key information to be documented is:

Subtasks
Skills
Knowledge for each task

The development team will want to ensure they capture information dealing with the performance of each of these areas. This information may include environmental conditions, tools needed, and TOs used, as well as the task performance standards in the work center. Example forms that can be used to document this process are shown in Tables 1 and 2.

Reviewing and validating analysis data

When task breakdowns are completed, review them with subject matter experts (SME). This will help validate the completeness and accuracy of the information and ensure that all required equipment has been identified. Ensure that each step or subtask required to perform the task has been identified. This may include any Major Command (MAJCOM) or local procedure. If the analysis has identified that there are several ways to perform a task, check with the SME in the work center to identify the most appropriate way to perform each task.

Table 1. Sample Task Description Worksheet

TASK DESCRIPTION WORKSHEET
Page ____ of ____ AFSC: Human Resource Development Spec/Tech - 751XX TASK NAME: NAME/DUTY PHONE OF DATA COLLECTOR:_____
STEPS IN TASK PERFORMANCE: **SKILLS/KNOWLEDGE:**
EQUIPMENT: **REFERENCES:**
PROFICIENCY LEVEL: _____ **ASSISTANCE REQUIRED:**
NOTES/REMARKS: **STS REFERENCE:**

Table 2. Sample Task Breakdown

TASK BREAKDOWN	
TASK NAME	
OBJECTIVE	
MATERIALS/EQUIPMENT REQUIRED	
STEPS IN TASK PERFORMANCE	**NOTES (List skills required, safety requirements, cautions, references, materials or tools, and assistance required)**

Section B
Identify Existing Training Sources

Introduction

Once the training tasks have been identified, the next step in the process is to identify existing training programs that can be used to meet the identified training requirements. Listed below are several current training programs. These programs may be used in conjunction with the training provided within the individual work centers.

Field or replacement training

Field or replacement training can be accomplished using several methods. Some of the methods are:

Career Development Courses (CDC)
Contract training
Specialized courses such as:
Auxiliary Maintenance Qualification Training Package (AMQTP)
Computer training packages (including software)
Supply training classes

Qualification training packages

Qualification Training Packages (QTPs) are normally developed by career field managers and contain task knowledge, performance requirements, or instructions on how to train a particular task. Supervisors and trainers will use a QTP when conducting training. Many of the QTPs contain study material for the trainee to gain the necessary knowledge about a task. A complete listing of all available QTPs can be found in the Air Force or MAJCOM 0-8 index.

Specialized training packages

Specialized Training Packages (STP) are developed by Air Education and Training Command (AETC) for completion at the individual's assigned unit. The training is accomplished using local resources, with a qualified technician serving as the instructor. Upon completion of the STP, the trainee's performance is evaluated by AETC and the certification or diploma is sent back to the home station. The available STPs are listed in AFCAT 36-2223.

Section C
Determine Training Objectives

Introduction

After the development team has reviewed existing training sources, the next activity is to determine the training objectives. Once it has been determined what the training objectives are, a decision must be made as to "how" the objectives are going to be met.

What is an objective?

An objective simply states the desired outcome after the training has been provided.

Documenting the objective

In order to remain clear on the training objective while designing the training, it is recommended the objective be documented in statement format. The objective statement will also serve as the basis for evaluation of the trainee's performance.

Parts of an objective

The objective statement can be broken down into three parts:

Condition
Performance/behavior
Standard

The performance/behavior should always be included in an objective statement, but the condition and standard may be implied or assumed. The best objective clearly states all three.

Determining training objectives

A good method for determining training objectives is to ask several questions focusing on the three parts of an objective. For example, for each task, ask the following questions:

What should the trainee be able to do if the training is to be successful?
How well should the trainee be able to perform?
What are the circumstances under which the trainee should be able to perform?

Determining training objectives (Continued)

Answering questions such as these will help the development team to develop the training objectives. These questions are further addressed in the following parts of this section.

First question

What should the trainee be able to do if the training is to be successful? The performance/behavior part of the objective statement answers this question. It identifies exactly what the trainee is required to accomplish. This is true for both performance-oriented actions (tasks or hands-on activities) and knowledge-oriented actions (facts/concepts/principles). The actions described should be measurable and observable and should match closely with the tasks identified in the analysis phase. When developing this part of the objective, ensure that the verb precedes the rest of the statement.

Example of Performance:

Repair J-58 fuel pump.
Prepare AF Form 2096.
Remove and replace B-52 engine oil pressure gauge.

Example of Knowledge:

Name the safety hazards in refueling a B-1 aircraft.
Identify the tools needed to repair a J-58 fuel pump.

If the performance examples look familiar, it may be because they are the same type of statement found on training standards. By itself, the performance/behavior part may also be called a behavioral statement. Be sure the verb is measurable. For example, the verb "know" is ambiguous.

Second question

How well should the trainee be able to perform? During the analysis phase, data was collected about the required performance standard in the work center, so the basis for this part of the objective statement already exists. The standard states how well the trainee should perform each task. There are many methods to describe the standard in an objective. Some examples are:

In accordance with (IAW) external authority (policy directive (PD), TO, checklist, etc.).
Percentage or number of errors.
Repetition of testing (e.g., two consecutive tests).
Physical tolerances (e.g., weight, rate, distance, degrees).
Time for completing the task.
Quality of finished product.
Degree of assistance/supervision.

There are certain tasks in which errors are permissible as long as these errors do not affect mission accomplishment. To determine this, decide whether errors are permissible in the performance task. Naturally, critical tasks need to be completed with 100 percent accuracy, but not every task is critical. In fact, the "Go/No Go" level is based on whether the individual can do the task or not.

This part of the objective statement may be written or implied. If the trainee must perform without errors, is it any clearer to state "no errors" than to imply it? Supervisors should decide based on what works best for their work center and what is the most clear to all concerned.

Third question

What are the circumstances under which the trainee should be able to perform? This portion, the condition, states what is to be denied, provided, given, or used during the performance by the trainee. Like the standard, this information was also collected during the analysis phase. The condition can make the specifics of what is to be performed more clear. Everyone likes to know what to expect when it is time to show what they can do.

The condition can be described in many different ways, such as:

Materials and equipment needed.
References needed or allowed (e.g., TOs, checklist).
Restrictions or limitations of performance.
Physical environment.
Simulation used.
Assistance or supervision provided.

It may not be necessary to state this part of the objective statement. Many times the condition can be implied or assumed as with the standard. For example, if the trainee is not allowed to have assistance or supervision during the evaluation of the task, is it clearer to state this fact? Also, for example, in sections within a work center a technical order (TO) is required to perform all tasks. In such cases, is the statement made clearer by stating the TO as a condition of performing the task or can it be assumed as a work center policy?

If the condition is not stated, then it can be understood that only those items needed to complete the task will be used. Supervisors should decide based on what works best for their work center and what is the most clear and effective to all concerned. If in doubt when to list all three parts of an objective, it is best to list them all.

Section D
Determine Evaluations and Criteria

Introduction

The objective states the outcome if the training is successful; therefore, supervisors and trainers need to know when the outcome of the objective has been achieved. This is accomplished by evaluating the trainee's ability to do what is stated in the objective. The method used to evaluate will vary, depending on whether the objective is performance- or knowledge-oriented. Use a performance scenario to assess performance and written or oral questions to measure knowledge. When evaluating both, the two measurements can be combined. Ensure that evaluation requirements for scoring are standardized for the trainees.

How are evaluations used?

Evaluations can be used for:

Certifying tasks.
Providing feedback on training.
Determining if remedial training is warranted.

Types of evaluations

Some of the types of evaluations that can be used are:

Informal practice exercises.
In-house evaluations.
Formal evaluations.
Third-party certifications.

Performance, written, and oral evaluations are further explained in the following parts of this section.

Performance evaluations

Generally, there are two types of performance evaluations:

Process evaluations.
Product evaluations.

In many cases, it may be appropriate to evaluate both the end product and the process used to create it. Performance

Performance evaluations (Continued)

evaluations are normally easy to develop because they are based on what the trainee is required to perform (the objective). If the trainee is required to "repair actuators," then that is what the performance evaluation should measure.

The more difficult part is developing the evaluation tool used to rate the performance. Using the following guidelines will help make the job of developing an evaluation tool much easier.

Guidelines for developing performance evaluation tools

Guideline points:

Include the desired performance/behavior used in the objective statement.
List the equipment, references, or supplies needed to complete the task.
Include general instructions such as:
What the trainee is to do.
What will be evaluated and when (process, product, or both).
When the trainee should actually start the task.
Time requirements.
Assistance or supervision allowed.
Specific directions needed for portions of the evaluation.

An example of a performance evaluation is shown in Table 3 as a student progress checklist.

Performance evaluation tools: Checklists

Checklists are one of the most reliable and recommended devices to score performance evaluations. Existing TO checklists may be used or new checklists may be developed for the purpose. If a checklist is developed, it should include the information and details about the task that were collected during the analysis phase. Some guidelines for developing checklists are:

Include instructions to the evaluator. This may include:
How to use the checklist.
How many items must be marked "SAT" to pass the overall evaluation?
Whether the evaluator should be rating the process, product, or both.

Performance evaluation tools: Checklists (Continued)

Include in the process checklist items such as:

Steps of the task.

Order in which the steps of the task should be performed.

Mention in the introduction or before the first step whether the order of task performance is mandatory.

Include in the product checklist items such as:

The scoreable characteristics of the product. These characteristics include things that distinguish a satisfactory product from an unsatisfactory product, such as:

Features of the product that are present or not present (e.g., signature block in the correct format on an official letter or no typos on a letter).

Product characteristics that can be measured (weight, length, voltage, etc.)

If the checklist is to be used to evaluate both the process and product, then list the steps and the scoreable characteristics as a checklist item.

Table 3. Sample Student Progress Checklist

STUDENT PROGRESS CHECKLIST																						
Course Number J3ALR3S231-000	Class Number	Names of Students																				
Project or Task Oil Change	POI Reference 4d	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
EVALUATION CRITERIA *(Sequential elements of task and/or traits and factors to be evaluated)*																						
INSTRUCTIONS: 1. Use this checklist to evaluate exercise 2-4d. 2. Indicate satisfactory performance with an "S" and unsatisfactory with a "U". Trainee should receive satisfactory ratings in 10 areas evaluated to receive a satisfactory rating on this exercise.																						
1. Vehicle placed in park. 2. Emergency brake set. 3. Chocks placed in front of rear tires. 4. Oil plug removed from oil pan. 5. Oil filter removed. 6. Gasket on new oil filter lubricated. 7. Oil plug replaced. 8. Oil filter replaced. 9. Cap removed from oil input area. 10. Four quarts new oil added. 11. Cap replaced on oil input area. 12. Engine started. 13. Checked for oil leaks. 14. Chocks removed.																						

Performance evaluation tools: Task scoring

After the checklist has been developed, ensure that the passing grade or score is based on the objective for performing the task. Some of the items that will help to score a task include:

Assigning each step of the task a point total. Some steps of task performance may not be as critical as others; therefore, assign less critical steps a smaller point value.

Identify what constitutes a passing or failing score in the checklist instructions. Some areas, such as safety, may be considered as an automatic failure if violated. If so, include this in the instructions as well.

Performance evaluation tools: Documentation

Several forms can be used to document and sequence the checklist similar to an AF Form 2519. If desired, a special form may be created for the purpose. Work center supervisors or trainers should use whichever form is suitable for the purpose. Work centers with TO checklists or job guides may prefer using them in conjunction with instructions to the evaluator as to how to score each task.

Oral evaluations

Oral and performance evaluations can be used to evaluate task knowledge. Oral questions require individuals to explain why they are performing certain functions. Ask questions only after a step of the task has been completed, never during the performance of the step. It is difficult to work and talk at the same time, especially if the task is complex. Also, avoid yes or no questions since they do not require the trainees to explain anything, and thus, little is learned about their understanding of the steps of the tasks.

Document the questions to be asked so they can be used by the evaluators to ensure that each trainee is asked the same questions. Asking the same questions of each student ensures the quality of the evaluation process as well as the quality of the trainee's performance.

Written evaluations

Written evaluations may also be used in addition to performance- and oral-type evaluations. The basic requirements for written evaluations are provided below. Additional information on developing written evaluations can be found in AFMAN 36-2236.

Developing the written evaluation

Instructions for the written evaluation should include information such as:

Text/references allowed to be used during the evaluation.
Time allotted to complete the evaluation.
Number of items on the evaluation.
Special instructions for answering specific evaluation items.
Minimum passing score.
Examples of how a correct response is marked.
How to change a response, if necessary.
Indication of whether the trainees can proceed independently or whether they must wait to proceed from one section to the next.

Written evaluations: Question formats

There are two basic formats for written questions:

Selection.
Supply.

Selection items include:

Multiple choice.
Matching.
True-false.

Scoring selection items is more objective than scoring supply items because the correct answer is chosen from provided responses.

Supply items include:

Essay.
Short answer.
Completion.

Written evaluations: Question formats (Continued)

These items require that an evaluator judge the response. This can lead to different scores or ratings from different evaluators.

Both types of questions can be used to measure for retention (memory) or transfer (application) of learning. The following table summarizes the written question formats and types.

Question Format	Types of Questions
Selection	Multiple Choice Matching True-false
Supply	Essay Short answer Completion items

Written evaluation: Scoring procedures

Selection-type tests are easy to score since only one answer is correct. However, as with any test, a minimum acceptable score for the test as a whole must be determined. Check MAJCOM and local policy before deciding on the minimum passing score for a test. Once the passing score has been determined, look at the number of answers and assign an equal number of points for each answer. When scoring the test, match the student's response to the answer key and subtract the number of incorrect answers. Then multiply the number of correct responses by the assigned point value for the total score.

The process is a little more complicated for supply-type tests. For these, determine what is to be the written reply. This includes whether an exact answer must be given or the test evaluator is allowed to interpret the response. If an interpretation is allowed, then decide what major points will be included and how, if at all. Partial credit may be given. Then write the correct response and all variances down, and explain the procedures to the test evaluators. Try to eliminate as much subjectivity as possible. This type of question is more difficult to grade and can cause disagreements on whether the trainee knows the subject matter.

Section E
Determine Training Sequence

Introduction

The tasks to be trained were determined during the initial evaluation, in the analysis phase. This allowed efforts to be concentrated on the most important training requirements and job tasks. When prioritizing the tasks, remember this list is only a guide to the order in which tasks should be trained. Circumstances may arise that require a task to be trained, or a series of tasks, out of the predetermined order. For example, during a training session, operational equipment may not be available to complete a particular task; therefore, it may be necessary to train other tasks out of sequence. The rate and ease at which students learn can also impact the training order.

Areas to consider when prioritizing tasks are:

- Mission requirements.
- Task requirements.
- Trainer availability.
- Equipment availability.
- Ease of learning.
- Supporting knowledge.

These considerations are further discussed in the following parts of this section.

Mission requirements

Since the training program being developed will focus on mission accomplishment, tasks directly associated with mission accomplishment are normally most critical. Critical tasks are those needed to successfully accomplish the mission. Tasks critical to the mission may be a high priority for training and should be accomplished first.

Also, look at how often the task must be performed. Frequently performed tasks may be high on the priority list. A task performed every day is also easier to train than one performed once every six months since the trainees have more chances for practice and reinforcement.

Task requirements

The next factor to consider is the training task itself. Consider how difficult the task is to perform. Task difficulty can be estimated by the subject matter experts (SME) or supervisor. Generally, more time will have to be spent teaching difficult tasks in order to guarantee proficiency. However, there is a simple solution: move the task higher on the priority list in order to start the training sooner so more time can be spent training the task. Also, some tasks may serve as "building blocks" for other tasks, which will normally require that they be trained first.

Support equipment availability

Another factor to consider that may affect the priority assigned to a given task is the availability of the equipment needed to conduct the training. For example, equipment needed to train an on-the-job training task may also be used to meet field training requirements; therefore, the equipment will have to be shared. Also, calibration or scheduled maintenance requirements can impact equipment availability during training sessions.

Trainer availability

The number of qualified personnel available to meet training requirements is another issue to be considered. The number of trainers and their qualifications will impact how training is prioritized. If trainers are not available when they are needed, it may be necessary to conduct training in groups instead of one-on-one. Also, it may be necessary to develop "in-house training classes" within the work center to offset the lack of trainer availability.

Ease of learning

A great deal is known about how individuals learn and how to present information so they will learn faster and remember longer. There are also several methods of sequencing task training to make the learning process easier for the trainee. The sequencing methods are:

Job performance order.
Psychological order.
Logical order.

These sequencing methods are further described below.

Ease of learning (Continued)

Job Performance Order

Job performance order requires tasks to be arranged in the order in which they would be performed on the job. Use the list of prioritized tasks and sequence them to be trained in the job performance order. This method applies both to tasks and to the procedural steps involved in performing the tasks.

Psychological Order

Psychological order requires tasks to be sequenced based on which are easiest to learn. In essence, trainees learn the simple before the complex. Consider using this method if a task is particularly hard to master or if a person is having trouble learning. It helps the trainee build up confidence and learn the basics prior to starting more difficult tasks.

Logical Order

Logical order is most often used because it is a blend of the job performance and psychological methods of sequencing. Workers are trained on the easiest tasks first, whenever possible. Each task is taught in the order it is normally performed, but when the hardest parts of the task are reached, trainers take over while the trainee watches. Little by little, the trainers allow the trainee to accomplish the harder steps of the task until they are able to perform all parts of the task.

Supporting knowledge

Performance tasks are difficult to train until knowledge about the performance is provided. Therefore, when determining the priority of the task to be trained, consider the priority of the supporting knowledge training requirements. Prepare a list of references to accompany each task. Then, have the trainees review the reference material before being trained on the task to gain an understanding of what is required to be done.

If there is a career development course (CDC), specialized course (SC), or qualification training package (QTP) available that addresses specific tasks, match up the appropriate volumes and sections to the task to be trained. Ask the trainees to document any questions they have about the supporting material so they can get the answers they need.

Section F
Determine Training Methods

Introduction

Once it has been determined what needs to be trained, it is necessary to determine what methods to use to train each of the required tasks. There are several methods that can be used to train a task. Three of the most common methods are:

Lecture.
Coach/pupil.
Demonstration/performance.

These methods are described below.

Lecture

The lecture method is normally used for the more basic types of learning such as how to complete a form. It is also an effective method of providing many of the unit training requirements as well as the supporting knowledge for performance tasks. Caution should be used when using this delivery method to ensure it does not become boring, thus affecting the learning process. This method can be used when it is necessary to provide a large number of trainees the same information on a task or series of tasks.

Coach / pupil

The coach/pupil method is a hands-on training method. This method provides the one-on-one training that is essential in most on-the-job training (OJT) environments. It is like having a mentor who guides the trainee through each step of a performance task. The coach/pupil method encourages greater learning because each trainee receives individual attention. This method works best when the number of trainees is small or if there are sufficient trainers available.

Demonstration / performance

In the demonstration/performance method, trainees are told what is to be done and shown how to do it by the trainer. Then the trainee performs the task with the trainer observing each step of the task as it is being performed and asking questions of the trainee to check the trainee's complete understanding of the task and supporting knowledge requirements. This method consists of four phases:

Explanation
Demonstration
Performance
Evaluation

The following table shows the activity associated with each phase of the demonstration/performance method.

Phase	Activity
Explanation	Trainer tells trainees exactly what is to be done and the materials to be used.
Demonstration	Trainer demonstrates how to perform the task.
Performance	Trainees practice performing the task.
Evaluation	Trainer rates the trainees' ability to perform the task according to the standard defined in the objective. **Do not** evaluate the trainees' performance until they have had adequate practice performing the task.

Section G
Determine Training Media

Introduction

There are many types of instructional media available such as instructors, computers, and actual equipment. Many of the media types are described later in this section. Determining or selecting the appropriate training media for a given training scenario is based on a number of factors and is a major concern in the training design process.

Media selection factors

There are a number of factors to consider when selecting the media for a given training situation. Some of the factors to consider are:

Effectiveness
Realism in the learning process
Ease of use
Development and maintenance cost

Types of media

There are many types of media that can be used to deliver training and reinforce the learning process. Each training situation will require analysis to determine which are the best media to use. Determining and selecting the appropriate training media during the training design phase will help ensure that the training program is effective and cost-efficient. Some of the training media available are:

Actual equipment
Print-based material
Job aids
Mockups
Simulators and trainers
Interactive courseware (ICW)
Filmstrips
Television
Transparencies
Flat pictures
Chalkboards

Types of media (Continued)

You will probably not use all of these types of media in any given situation. A brief discussion of each media type is provided below.

Types of media: Actual equipment

One of the best media available for training a performance task is the actual equipment on which the trainee will be working on a daily basis. Using the actual equipment reinforces realism and increases transfer of the information from the training environment to the job.

Types of media: Print-based material

Print-based material includes items such as directives, manuals, handbooks, and technical orders (TO) which are normally used in performance of the job. Using the actual printed materials that trainees will use on the job instills realism in the training program. Also consider commercial publications, career development courses (CDC), qualification training packages (QTP), or even locally developed materials for use in the training program.

Types of media: Job aids

Job aids are tools to use during performance of a task. They may include samples, "cheat sheets," or operating instructions (OI). Some equipment may also have quick reference instructions or owner's manuals that could be used as job aids. Technical orders can also be considered as job aids.

Types of media: Mockups

A mockup may be a two- or three-dimensional representation of the original. It can be used for study, training, or testing in place of the real object, which may be too costly, dangerous to operate, or difficult or impossible to obtain.

Types of media: Simulators and trainers

If the actual equipment is not available for training, consider using a simulator or trainer. Simulators and trainers provide the trainee with a realistic setting and allow for good transfer of learning to the actual piece of equipment.

Types of media: Interactive Courseware (ICW)	Several types of media fall in the category of ICW. Computer-assisted instruction (CAI) courses are developed for use with standard Air Force automated systems. This method is good for providing basic information. Trainees bring the lesson up on a computer screen, work through it, and answer any required questions. Programs are available to teach problem solving or to simulate dangerous or expensive situations. Newer technology makes use of video and compact disc (CD) in conjunction with the computer.
Types of media: Filmstrips	Filmstrips may be used to show how a task is performed. They can be used alone, or you can incorporate sound on tape with the filmstrip. Filmstrips work well to support fairly static tasks.
Types of media: Television	Television includes the use of videocassette recorders (VCR). When used with VCRs, television can be an effective teaching aid. As the VCR tape is being made, the operator has control of the shots and different angles used.
Types of media: Transparencies	Transparencies are used to show an outline or even a diagram, or portion of it. Transparencies are simple, easy, and inexpensive to make and are more likely to be used in a classroom environment.
Types of media: Flat pictures	Flat pictures are valuable because they provide a realistic view of portions of a task, the equipment to be worked on, or even different situations that may be encountered.
Types of media: Chalkboard	In the world of high technology, the chalkboard remains one of the more versatile types of teaching aids available. It can be used to write information, draw diagrams, or even display posters. Unlike many other types of media, the chalkboard can support real-time adjustments in what is being displayed.

Section H
Define Resource Requirements

Introduction

One of the key factors in designing unit training or on-the-job training (OJT) is resources. Throughout the entire Instructional System Development (ISD) process, resources will always be a major concern. Regardless of the role in the training system, everyone has a resource responsibility. During the design phase, the development team should define the resource requirements for the training program. Resources as used in this handbook are defined on page 52. Sources that 52

Equipment and tools

There are several steps that can be followed, as a guideline, to define or identify requirements for equipment and tools to conduct unit training or OJT programs. The steps are shown in the following table.

Step	Activity	Purpose
1	Review training standard(s).	To identify major equipment requirements.
2	Review task breakdown and training references.	To determine types and numbers of equipment and tools required for one individual to perform the task.
3	Review number of trainees.	To determine total amount of equipment and tools required to perform the task.
4	Plan for equipment and tool usage.	To determine how trainees will use or share equipment and tools for tasks requiring team performance or when a resource is limited.

Identify equipment and tools

The performance/behavior of the objectives should identify what major pieces of equipment will be required to provide adequate training to the trainees. Task breakdowns should also specify all other equipment and tools required to complete the task. The required equipment and tools, in sufficient quantities, should be on hand before starting the training session.

Determine availability of equipment and tools

After the equipment and tools have been identified, make sure of their availability. For example, if an aircraft is needed to perform an OJT task, the aircraft should be scheduled for training use; necessary aircraft support equipment should be available; and close coordination with other maintenance functions is recommended to ensure they are not adversely impacted. The same applies for other major pieces of equipment. Making a phone call the day before the equipment is needed for the training session normally does not work well.

A good policy is to always develop alternate plans, such as using or building a trainer or simulator that is an exact duplicate of the original equipment, if the cost can be justified. Another example is to develop training tool kits to be used during the training session rather than issuing tools to each trainee. Issue training tool kits to selected groups of trainees when budget restrictions require trainees to be split into several training groups. This spreads out the available tools to help ensure that training takes place at the scheduled time.

Facilities

Adequate facilities are required to conduct all unit-level training. These facilities should be located in an area conducive to learning. Following are some guidelines to help identify facility requirements for unit training.

Step	Activity	Purpose
1	Review facility requirements.	To identify type of facility required. Consider size, location, and accessibility (handicapped, parking, security clearance).
2	Determine availability of facility.	To determine if facility is conducive to training (e.g., limited distractions).
3	Plan utilization of facility.	To make sure the facility is available when needed. Consider ORIs, exercises, SAV scheduled, maintenance of facility.

Human resources

Several individuals play a key role in designing, developing and conducting successful training programs. Some of these individuals are:

Curriculum developers. These individuals have the responsibility to design training programs based on inputs from SMEs, supervisors, trainers, and others.

Supervisors. These individuals are responsible for identifying training requirements. They must be aware of the qualifications of all work center personnel and determine if any training is needed to fulfill mission requirements.

Trainers. These individuals are responsible for providing quality training to the trainees. They must be highly qualified and motivated in order to be effective.

Trainees. These individuals have the responsibility to learn to perform their assigned jobs to the best of their ability.

There are several steps that can be followed, as a guideline, to assist in identifying human resource requirements needed to conduct training programs. They are:

Step	Activity	Purpose
1	Review personnel requirements.	To determine the number of individuals required to conduct training and receive training.
2	Determine qualifications required.	To identify grade, skill level, experience, subject knowledge, ability to train, and trainer availability.
3	Review number of trainees.	To determine the trainer/trainee ratio required, task certifier requirements, subject matter experts, and curriculum developers needed.

Money

During the planning process the requirements for equipment, facilities, and personnel are identified. Once these resources are identified it is time to determine the funds required for these resources.

There are several steps that can be used as guidelines for identifying the funding requirements. The steps are:

Step	Activity	Purpose
1	Review funding requirements.	To determine if adequate funding is available to support training program.
2	Identify budget process.	To obtain necessary funding to support training program.
3	Determine funding priority.	To establish priorities to ensure that critical training requirements are met.

Time

How much time is available? How much time does it take to train each task? Can time be scheduled to provide the training? Are trainers and trainees available for the training period? In order to answer questions such as these, the steps in the following table can be used as guidelines for determining the amount of time required.

Step	Activity	Purpose
1	Review time constraints.	To determine time line, number of trainers vs. training requirements, equipment, availability, funding, and facilities.
2	Identify time constraints.	To determine the most time-critical requirement.
3	Determine training life cycle.	To meet mission requirements, mandates from headquarters, OSHA requirements, and EPA requirements.
4	Determine training time.	To identify how long it takes to train the task; identify required certification considerations.

Chapter 6
DEVELOPMENT

Overview

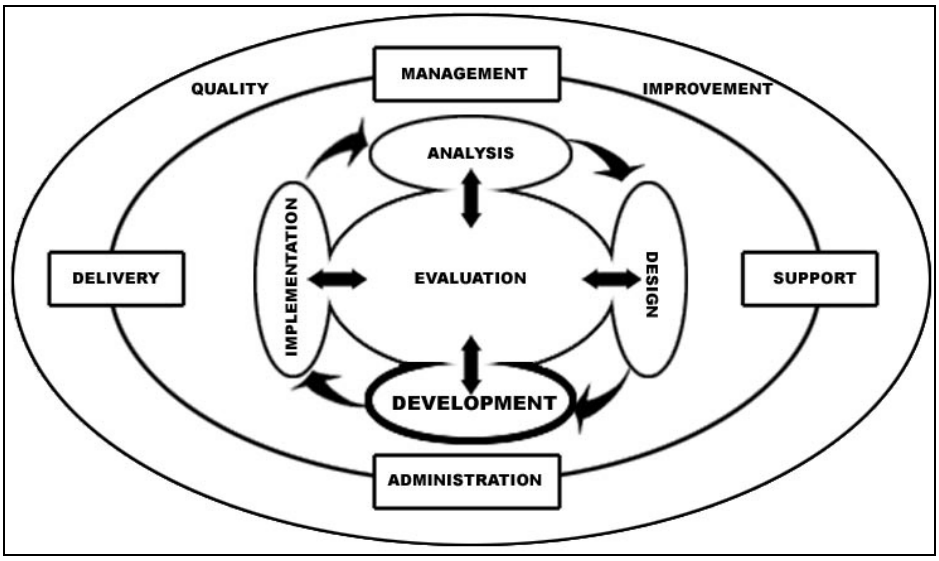
Introduction

After the design phase of the Instructional System Development (ISD) process has been completed and the training system has been designed, it is time to implement that design by developing the training. In the development phase of the ISD process, all of the training development team's planning, analysis, and design efforts come together to develop the required unit training or on-the-job training (OJT) program. Remember, when developing training, the goal is to develop effective, cost-efficient training. This can be achieved by continually focusing on the quality of the development process and the products of the process.

Where are you in the process?

To this point, the necessary analysis and design activities have been completed and it is time to enter the development phase. An ISD model with the development phase highlighted is provided in Figure 12 to help visualize the entire ISD process before beginning this phase.

Figure 12 Development Phase



Objectives

The objectives of this chapter are to:

Describe training guides.
Discuss training media development and acquisition.
Explain how to schedule training.
Discuss training validation.

Where to read about it

This chapter contains four sections.

Additional information

For additional information on developing training, see:

AFMAN 36-2234, Instructional System Development.
AFMAN 50-62, Handbook for Air Force Instructors.
Leshin, C. B., Pollock, J. and Reigeluth, C. M. (1992). *Instructional Design Strategies and Tactics*. Englewood Cliffs, New Jersey: Educational Technology Publications.
Rossett, A. and Gautier-Downes, J. (1991). *A Handbook of Job Aids*. San Diego, California: Pfeiffer and Co.

Section A
Develop Training Guides

Introduction

Training guides or lesson plans are essential to unit and on-the-job training programs. As the name states, they serve as guides for the supervisor or trainer to conduct training. The requirement for training guides and their format can be determined by the Major Command (MAJCOM) or the local units. Training guide development is discussed in later parts of this section.

Purpose

The purpose of the training guide to standardize the instruction. In other words, training guides ensure that all trainees receive the same training. Standardizing training improves the overall quality of the training program.

Developing training guides

As previously stated, there is no set requirement for training guide format. However, it is recommended that consideration be given to using the three-part training guide format. The three main parts of a training guide are:

Introduction
Development (body)
Conclusion

An example of a training guide is included in Table 4. Each of these parts is described below.

Training guide: Introduction

The introduction to a training guide or lesson plan has four elements or steps:

Attention
Motivation
Overview
Transition

These four elements are further described on the next page.

Training guide: Introduction (Continued)

Attention Step

The attention step is used to alert the trainees that the trainer is ready to begin the lesson. It is used to gain the attention of the trainees. Trainers often use stories, jokes, or other verbal or nonverbal action to gain their attention.

Motivation Step

The motivation step is used to gain the trainees' interest in the training. This step may be combined with the attention step. The trainer should explain why it is important for the trainees to learn the information that will be presented during the training session. For example, the trainer may want to explain how the trainees will use the information in the future to perform their overall job.

Overview Step

An overview provides an explanation of what to expect during the lesson. It normally includes an explanation of the objective and the major teaching steps. This overview provides a "roadmap" to help the trainees follow the lesson.

Transition Step

The transition step allows the trainer to move from the introduction to the body of the teaching guide or lesson plan. It also is used to focus the trainees' attention on the first major teaching step.

Training guide: Development (body)

The development part of the training guide is titled either "development" or "body". This part contains information taught to the trainees. There are numerous ways to format or write the body of the lesson plan. There are one- and two-page formats, as well as a two-column format.

The single page format is like writing a letter or a book. The teaching steps are listed along with any trainer's personalization that might be added.

Training guide: Development (body) (Continued)

The two-page format has the teaching steps (for the trainer) on the left-hand page and the trainer's personalized notes on the right-hand page.

The two-column format is similar to the two-page format. The teaching steps are identified in the left-hand column while the trainer's personalized notes are in the right-hand column.

Regardless of the format, use task breakdowns to complete the body of the lesson plan. The task breakdown contains all of the steps, skills, knowledge, and procedures required to complete a task. This ensures that all information required to complete a task is contained within the lesson plan, thus assuring effective and quality training.

Training guide: Conclusion

The conclusion is used to end the lesson. It has three parts:

Summary
Re-motivation
Closure

These three parts are further described below.

Summary

The summary is used to remind the trainees of the objective and major teaching steps of the lesson. This step allows trainees to review the information learned and clear up any misconceptions. New information should not be included in the summary.

Re-motivation

The re-motivation step allows the trainer to remind the trainees why it is important to remember what was taught and how the information applies to them. The trainer may use the same or similar examples from the motivation step in the introduction.

Closure

The closure statement or action is to let the trainees know the lesson is over. Examples of lesson closures include using a quote, giving advice, transition to another lesson, or whatever will let the trainee know that the lesson is finished.

Table 4. Sample Training Guide

TRAINING GUIDE
INTRODUCTION (_____ MIN) ATTENTION: MOTIVATION: OVERVIEW: TRANSITION:

Section B
Develop or Acquire Training Media

Introduction

During the design phase, the development team determined the most effective, cost-efficient training media that should be used for each lesson in the training program. In the development phase, the team develops or acquires the training media to present each lesson in the unit or on-the-job training program. In this section, the training media discussed will be the same as those covered in the design chapter in this handbook.

Actual equipment

Being in an operational environment normally means there will be equipment to do the job. For the most part this will be the same equipment needed to conduct the training. However, it is likely this equipment will have to be shared with the operational user. One way to offset this is to provide the training on a real mission requirement. This way the mission and the training task can be accomplished at the same time. The involvement by the trainees will depend on the nature of the mission task to be accomplished and where the trainees are in the training program.

Print-based material

Much of the print-based material used to conduct OJT will already be developed and available for use. Like using operational equipment, there is normally a great deal of printed material available which is used to operate and maintain the equipment every day on the job that can also used for training. Examples of print-based material are:

Policy directives (PD)
Manuals
Handbooks
Operating instructions (OI)
Technical orders (TO)
Owner's (commercial) manuals

Other existing printed materials such as QTPs, STPs, and CDCs are developed with the OJT program in mind. If these materials are not available for some of the required training, training guides and study materials can be developed and reproduced locally. Many units have microcomputers outfitted with a number of good, "user- friendly" word processing programs that will aid in the development of training materials.

Job aids

There are many choices in format, design, and materials that can be used when developing job aids for training purposes. Examples of some of the most common job aids are:

Instruction plate on a hot water heater.
Instructions on a credit card telephone.
Instructions with a VCR on how to "hook it up."

If the job aid is to be used to remember the steps of a task, use the task breakdown as a guide. A job aid can also be used as an example of a finished product. A Job Aids checklist from a technical order (TO) may be enough by itself or it can be used as the basis for a job aid to which more detail can be added. Services such as the local audiovisual services or printing plant may be required to assist in the development of more elaborate job aids.

Mockups

If it is not convenient or safe to use the actual equipment or to conduct training in the actual job environment, it may be effective and cost-efficient to build or procure a mockup to use for training purposes. Some bases have a trainer fabrication shop to help with the design and development of the mockup. The mockup does not have to look exactly like the actual equipment, but to be effective as a training aid it needs to operate like the actual equipment. The audiovisual services may also be able to help with the design and development of simple mockups.

Simulators and trainers

Normally, simulators and trainers are more complex and expensive than mockups and often look like the actual equipment being simulated. Before designing and developing simulators or trainers, ensure that the cost can be justified. The acquisition process for simulators and trainers is often very similar to that of the mockup. If the base fabrication shop has the necessary experience, they can normally help design and develop simulators and trainers to be used for training purposes. However, the more sophisticated, expensive simulators and trainers are normally procured by the Air Force from civilian contractors who are responsible for design and development.

Interactive courseware

Some interactive courseware is developed by Air Education and Training Command (AETC) and forwarded to the field. Entry and completion are controlled at the base level; however, these courses are announced in AFCAT 36-2223. Using an authoring system, computer-assisted instruction (CAI) lessons can be developed in the field for local use. More information on developing interactive courseware can found in AFMAN 36-2235, Volume 5. If necessary, ICW can be procured through the normal procurement process at the local base or a MAJCOM level.

Filmstrips

Equipment for developing filmstrips can be purchased by the local unit. However, it may be more cost-efficient to have the base audiovisual (AV) services develop the filmstrips. Some AV centers allow the local units to develop filmstrips using their laboratory and will also provide assistance and guidance as necessary. They may allow equipment to be checked out so the local unit can develop their own filmstrips. If the AV center is to develop the filmstrips, the development team will need to provide the technical content information and serve as subject matter experts (SME).

Videotape

Videotape and audiovisual technology have been effectively and cost-efficiently used as a training delivery method for years. Affordable video cameras and videocassette recorders (VCR) have increased the popularity and use of this delivery method at the unit level. Although some training units may have the capability to produce videotapes for training, most do not. Be aware that bases normally have audiovisual personnel who may be able to assist you in developing videotapes or other audiovisuals for training. Also, some MAJCOMSs have Detachments that develop audiovisual training for specific defense systems. These Detachments may be able to assist you in developing unit level training.

Transparencies

Transparencies can be made using word processors and copiers or graphics packages that will run on the microcomputer.

Flat pictures	Pictures can be taken and developed by the AV center or taken by the training development team, with the development being done by the center. Some print media contain figures that are suitable for use and can be copied on a copier for use in the training program.
Chalkboard	The chalkboard is the most versatile media if spontaneity is required. Portable chalkboards are comparatively inexpensive and can be set up almost anywhere. The newer types (markerboards) use colored markers, which enhances the presentation of the information. If working with schematic diagrams, a good way to use the chalkboard is to use an opaque projector to project the diagram on the board and then trace around the image projected on the board.

Section C
Finalize Training Schedule

Introduction

Scheduling training is a very important activity if the training programs that have been developed are to be successful. It goes without saying that scheduling should occur well in advance of the training session, allowing sufficient time for all of the necessary arrangements to be made. Scheduling should not be a haphazard affair; to be effective it should be a controlled process. Scheduling training involves two main activities—selecting trainers and task evaluators, and identifying and scheduling training time. These activities are discussed in this section.

Selecting trainers and task evaluators

A major concern when scheduling training is the availability of competent, qualified trainers and task evaluators to provide and evaluate the training. Properly identifying these resources is a critical activity in the training program.

A trainer or task evaluator should not be someone who has nothing else better to do. These individuals will be training and evaluating others on a task, or series of tasks, for which the supervisor remains responsible. Therefore, trainers and evaluators should be designated based upon their job experience and ability. It should not be based solely on rank, time in service, or time in the AFS.

Trainer / certifier policy

Air Force policy sets specific criteria for who can be a trainer or task certifier. One basic requirement is that trainers and certifiers will be appointed, trained, and certified. This aids in the selection process by identifying who is qualified and authorized to train and evaluate others. Another requirement is that no one may evaluate the training they provide. Even though an individual may be appointed and qualified to train and certify the same task, training must be evaluated by another qualified evaluator who is not the trainer. This helps to ensure that trainees receive as unbiased an evaluation as possible.

Identifying and scheduling training time

One of the most common problems in getting the training accomplished is finding the time to do the training. Effective time management will help with the problem of not having time to do the training. There are days when it will be very hard to get any training accomplished due to mission requirements. However, have the trainees observe the tasks being performed so they can gain some insight into the task. This also helps the trainees maintain an interest in the training program. Also, there will be numerous days when the workload will not be very heavy, allowing sufficient time for training.

An experienced supervisor should be able to estimate the peak work times and schedule training accordingly. Be as flexible as possible when scheduling training. The trainee's program should not be written in stone. If a unique training task needs to be accomplished, have the trainee go along to observe the task being performed.

Note: Consider scheduling the normal day-to-day work requirements with "hands-on" training included. Also, consider scheduling the task certifiers to conduct the courses used to train the trainers.

Section D
Validate Training Program

Introduction

The last activity or step in determining the quality, effectiveness, and cost-efficiency of a work center's training is to validate the program. Validation will identify whether there are problems to be corrected. Correcting identified problems and continually improving the training program ensures a reliable, quality training program. This section describes the validation activities.

Validating the training program

Before it can be validated, the training program should be conducted or tried out to see if it does what it is intended to do. There are two ways to try it out:

Subject matter expert validation.
Trainee validation.

These validation methods are further described below.

Subject Matter Expert (SME) Validation

Who to try the training out on depends on whom the training is for. Have co-workers sit through the training session if it is geared toward the AFSC or work center. If it is for another shop, use their SMEs.

Despite whom it is for, observe training and see where problems occur or training can be improved. See how the information is perceived by the trainees. Determine whether the SMEs will have problems understanding what is said, or whether they can perform the procedures based on what they are told. If the SMEs have a problem with the training, it is likely the trainees will also have a problem.

This tryout only points out where the problems may occur. The real test is with the trainees themselves.

Trainee Validation

For this type of validation, use the actual trainees who need the course. The test group should know where problems exist and

Validating the training program (Continued)

where improvements can be made in the training. Remember, the training session is for the trainees, not the trainer. They need to learn the material to be able to perform the job. The better the material is, the more they will learn. Don't be surprised if the trainees identify different problems than the SMEs did.

Revising the training program

As validation proceeds, problem areas may be pointed out by the trainees. Errors in one area may cause problems in others. In other words, look for the root cause and forget the symptoms. Problems could be in either objectives, tests, lesson plans, or visual aids used. Each of these problem areas is discussed below.

Objective

Review the objective to make sure it matches up with the training standard. If the objective does not match the training standard element, then it needs to be revised to match the element in the training standard. When and if the objective and the training standard element match, continue to the next possible problem area.

Test

Look at the type of test provided. Determine whether it supports the objective. If it matches what is required by the performance/behavior portion of the objective, look at the make-up of the test itself.

Knowledge Test. If an oral or written knowledge test is used, look at the stem of the question. Trainees may have pointed out questions that are poorly written or phrased, or do not apply to the objective. Revise or remove these questions from the test. Also, review the scoring procedures. It may be possible an answer key was not used and some of the test responses were mismarked.

Performance Test. Make sure the references and materials are those required to perform the task. Next, check the instructions to make sure they are clear and easy to

Revising the training program (Continued)

understand. Rewrite them if they are not. Then, investigate the scoring procedures. Review the checklist to make sure:

There are instructions to the evaluator.
Task performance steps are identified.
Steps are specific enough as to what is to be accomplished.
Scoring points are assigned to each step.
Evaluators are trained in use of the checklist.

When any necessary corrections have been made to the test, then proceed to the next activity, which is reviewing and revising the training guide or lesson plan.

Lesson Plan

Begin by reviewing the task breakdown. Make sure the necessary subtasks, procedural skills, and supporting knowledge have been identified. Next, check the lesson plan. Determine whether all necessary information is included in the lesson plan. If it is, check on how the lesson was delivered to the trainees. The problem may have occurred because the trainer was not sure of the material being delivered. Once the lesson plan has been reviewed and revised, then look at the training aids.

Training Aids

Make sure training aids are effective, clear, and readable by the trainees. Revise them if they are not. If using visual aids, it is possible they do not correctly show how a task, or portion of a task, is to be accomplished. Visual aids may also provide something different from what the trainer is teaching during the training session.

Chapter 7
IMPLEMENTATION

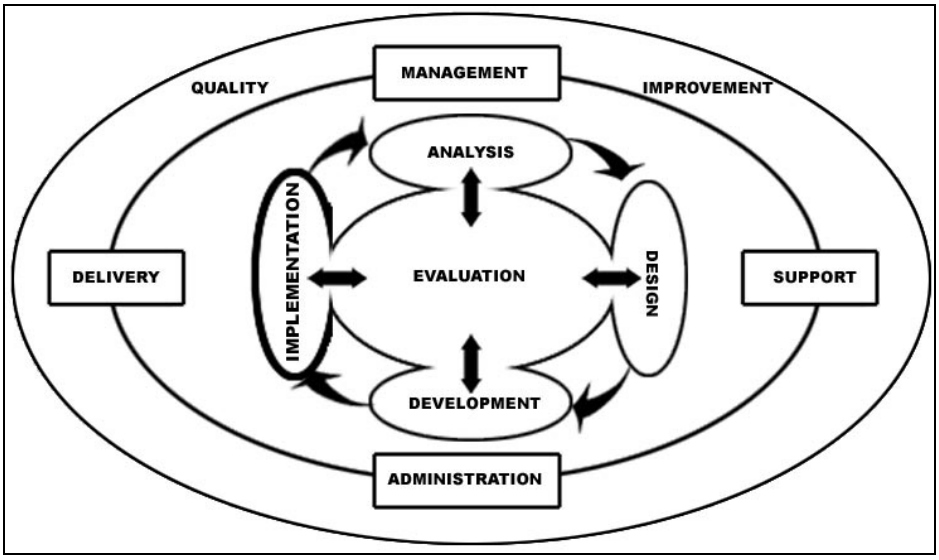
Introduction

Before implementing a unit training course or an OJT program, make sure the system functions are in place, the supervisors and trainers are prepared to conduct and administer the training, and the required resources such as trainees and trainers, equipment and facilities are available. Once the training is implemented or becomes operational, ensure that the training system receives the necessary support and maintenance. Also, remember to periodically conduct operational evaluations to ensure that the course or program continues to operate effectively and cost-efficiently and to produce trainees who can meet or exceed the job performance standards established by the training standard and the unit.

Where are you in the process?

The unit's training course or OJT program has been designed and developed and now it is time to enter the implementation phase. An ISD model, with the implementation phase highlighted, is provided in Figure 13 to help visualize where you are in the process.

Figure 13 Implementation Phase



Objective

The objective of this chapter is to present an outline of various steps or tasks one can take to implement training. They are not to be considered all-inclusive. Modify them to fit your situation.

Implementation outline

Schedule training

- Identify training requirements.
- Consolidate training requirements.
  - Group related items.
  - Determine backlog.
- Prioritize training requirements.
  - Primary considerations:
  - Mission-essential training
  - Mandatory requirements
  - Overdue training
  - New systems
  - Seasonal training
- Prepare tentative schedule.
- Coordinate schedule with:
  - Training provider
  - Equipment provider
  - Work centers
  - Other affected agencies
- Finalize and distribute approved schedule.
  - Work center supervisors fill allocations.
  - Ensure that personnel meet mandatory training requirements.
  - Some examples to consider:
    - Mandatory training prerequisites
    - Driver/equipment operator license
    - Security clearance
    - Physical requirements
    - Special individual equipment

Implementation outline (Continued)

Conduct Training

Schedule facility.
Schedule equipment.
Schedule qualified instructor or facilitator.
Ensure that adequate media/materials are available.
Reconfirm schedule one day prior to training start.
Ensure that equipment is in good working order prior to training start.

Certify Tasks

Ensure that evaluator meets year-of-training requirements.
Ensure that individual was trained on the task.
Explain evaluation procedures and techniques including:
- Safety requirements
- Automatic failure items
- Necessary safety gear
- Tools/equipment allowed
- Process versus product
- Number of assists permitted
- Use of technical data; what is required and what is permissible

Conduct evaluation.
Determine results of evaluation.
Provide feedback on evaluation; address both strengths and weaknesses.
Reschedule evaluation if necessary.
Document individual's certification.

Chapter 8
EVALUATION

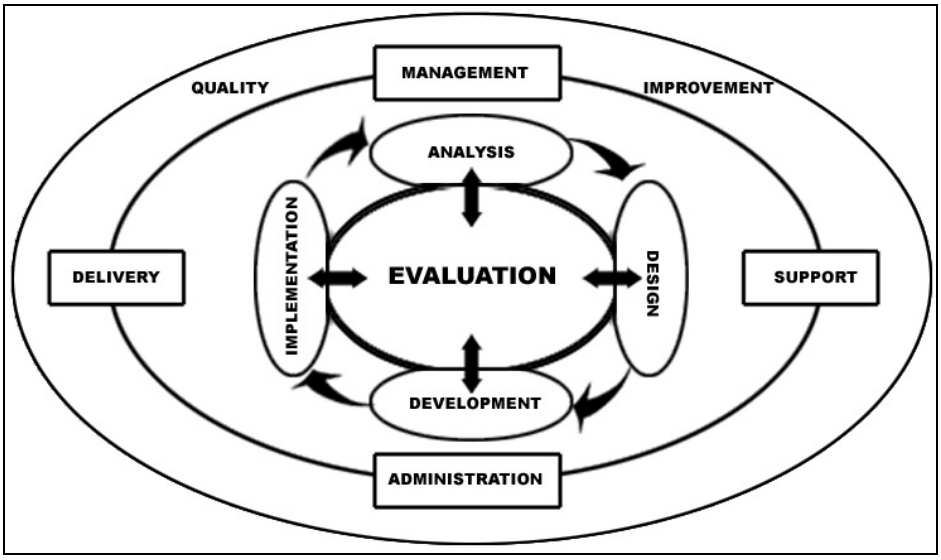
Introduction

Evaluation is an integral part of the Instructional System Development (ISD) process. During the planning stages of an ISD project, the training development team begins by determining how the process and products of each phase of the ISD process will be evaluated. As the training development team enters or reenters the various phases of the ISD process, evaluation activities play a key role. Planning for and conducting continuous evaluations throughout the entire ISD process ensures continuous quality improvements in the training program.

Where are you in the process?

The ISD model, with evaluation highlighted, is provided in Figure 14. As depicted in the model, each stage in the ISD process involves evaluation activities and feedback.

Figure 14 Evaluation



Objective

The objective of this chapter is to present an outline of the various steps or tasks one can take to evaluate the instructional system. Modifying this outline to fit your specific needs and performing the tasks suggested will help determine the effectiveness of an instructional product or process. It will also help determine specific causes for training effectiveness or lack of it and determine changes needed.

Evaluation outline

Evaluation outline points are:

- Perform annual training review.
- Conduct customer feedback surveys.
  - Customers can include:
    - Supervisors
    - Outside agencies
    - Anyone who may come in contact with trainees in performance of their job
- Conduct trainee surveys.
- Feedback includes areas such as:
  - What works
  - What did not work
  - Instructions
  - Training time
  - Recommendations
- Determine training reliability. (Did it do what it was supposed to do?)
- Utilize:
  - Customer surveys
  - Internal quality reviews
- Determine reasons for training ineffectiveness.
  - Conduct review using ISD process on:
    - Mission statement/quality goals
    - Course documents
    - Training documents
    - Training delivery
    - Training media
    - Target population
- Correct training deficiencies. (Criticality will determine how quickly the deficiencies should be corrected.)
- Identify mission/structure changes.
  - Weapon system updates
  - New computer system/hardware/software
  - Environmental impacts

Evaluation outline (Continued)

Determine effectiveness of evaluation process.
- Have trainers/supervisors and task certifiers been identified and trained?
- Have they attended the trainer course as well as the task certifier course?
- Have evaluations been conducted as required by the different AFSC CFETPs?
- How does the customer rate the unit/base evaluation process?

Continuous evaluation

Remember that evaluation is continuous, occurring in all phases.

Additional information

For additional information on evaluation, see:

AFMAN 36-2234, Instructional System Development.

RICHARD E. BROWN III, Lt General, USAF
DCS/Personnel

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

AFPD 36-22	Military Training
AFI 36-2201	Developing, Managing and Conducting Military Training
AFI 36-2301	Professional Military Education
AFMAN 36-2234	Instructional System Development
AFMAN 36-2236	Handbook for Air Force Instructors
AFH 36-2235	Information for Designers of Instructional Systems (12 Volumes)
Vol 1	ISD Executive Summary for Commanders and Managers
Vol 2	ISD Automated Tools/What Works
Vol 3	Application to Acquisition
Vol 4	Manager's Guide to New Education and Training Technologies
Vol 5	Advanced Distributed Learning: Instructional Technology and Distance Learning
Vol 6	Guide to Needs Assessment
Vol 7	Design Guide for Device-based Aircrew Training
Vol 8	Application to Aircrew Training
Vol 9	Application to Technical Training
Vol 10	Application to Education
Vol 11	Application to Unit Training
Vol 12	Test and Measurement Handbook

Walter Dick, Lou Carey, James O. Carey (2000). *The Systematic Design of Instruction 5th Edition*. Addison-Wesley Pub Co. ISBN 0321037804.

Patricia Smith & Tillman Ragan (1999). *Instructional Design, 2nd Edition***.** John Wiley & Sons, 399 pages. ISBN 047136570X.

Ruth Clark (1999). *Developing Technical Training 2nd Edition: A Structured Approach for Developing Classroom and Computer-based Instructional Materials.* International Society for Performance Improvement. 238 pages. ISBN 1-890289-C7-8

M. David Merrill (1994). *Instructional Design Theory.* Educational Technology Pub. ISBN 0-87778-275-X.

M. David Merrill, Robert D. Tennyson, and Larry O. Possey (1992). *Teaching Concepts: An Instructional Design Guide 2nd Edition.* Educational Technology Pub. ISBN 0-87778-247-4

Robert M. Gagné, Leslie J. Briggs, and Walter W. Wager. (1992). *Principles of Instructional Design 4th Edition.* Wadsworth Pub. Co. 365 pages. ISBN 00300347572

Robert M. Gagné (1985). *The Conditions of Learning and Theory of Instruction 4th Edition.* Holt, Rinehart and Winston. ISBN 0-03-063688-4

Jeroen J. G. van Merriënboer (1997). *Training Complex Cognitive Skills.* Educational Technology Publications.

Ruth Clark (1998). *Building Expertise: Cognitive Methods for Training and Performance Improvement***.** International Society for Performance Improvement. 204 pages. ISBN 1890289043.

Bernice McCarthy (1996). *About Learning.* Excel, Inc. 452 pages. ISBN 0-9608992-9-4

Malcolm Fleming & W. Howard Levie (Editors) (1993***).*** *Instructional Message Design: Principles from the Behavioral and Cognitive Sciences 2nd Edition*. Educational Technology Publications. 331 pages. ISBN 0-87778-253-9.

Ellen D. Gagné, Frank R. Yekovich, and Carol Walker Yekovich (1993). *The Cognitive Psychology of School Learning. 2nd Edition.* Addison Wesley Longman, Inc. 512 pages. ISBN 0673464164.

Marcy P. Driscoll (1999). *Psychology of Learning for Instruction 2nd Edition.* Allyn & Bacon. 448 pages. ISBN 0205263216

Ann E. Barron & Gary W. Orwig (1997). *New Technologies for Education: A Beginner's Guide 3rd Edition.* Libraries Unlimited. ISBN 1563084775

Robert Heinich & Michael Molenda (1998). *Instructional Media and Technologies for Learning 6th Edition.* Prentice Hall. 428 pages. ISBN 0138591598.

Diana Laurillard (1993). *Rethinking University Teaching: A Framework for the Effective Use of Educational Technology***.** Routledge. ISBN 0415092892.

Tom Boyle and Tim Boyle (1996). *Design for Multimedia Learning.* Prentice Hall. 275 pages. ISBN 0132422158.

William W. Lee and Diana L. Owens (2000). *Multimedia-Based Instructional Design: Computer-Based Training, Web-Based Training, and Distance Learning.* Jossey-Bass. 304 pages. ISBN 0787951595.

Margaret Driscoll & Larry Alexander (Editor) (1998). *Web-Based Training: Using Technology to Design Adult Learning Experiences***.** Jossey-Bass Inc. 288 pages. ISBN 0787942030.

Brandon Hall (1997). *The Web-Based Training Cookbook.* John Wiley & Sons. 496 pages. ISBN 0471180211.

Stephen M. Alessi & Stanley P. Trollip (2000). *Computer Based Instruction***.** Allyn & Bacon. 432 pages. ISBN 0205276911.

Andrew S. Gibbons & Peter G. Fairweather (1998). *Computer-Based Instruction. Educational Technology.* 570 pages. ISBN 0877783012.

Douglas M. Towne (1995). *Learning and Instruction in Simulation Environments***.** *Educational Technology.* 351 pages. ISBN 0877782784.

Thomas M. Duffy & David H. Jonassen (Editors) (1992). *Constructivism and the Technology of Instruction: A Conversation.* Lawrence Erlbaum Associates. 221 pages. ISBN 0805812725.

Brent G. Wilson (1995). *Constructivist Learning Environments: Case Studies in Instructional Design.* Educational Technology Publications. ISBN 0877782903.

Roger C. Schank (Editor) (1997*). Inside Multi-Media Case Based Instruction. Lawrence Erlbaum Associates*. 451 pages. ISBN 080582538X.

David H. Jonassen, Wallace H. Hannum & Martin Tessmer (1999*). Task Analysis Methods for Instructional Design.* Lawrence Erlbaum Associates. 275 pages. ISBN 0805830863.

Allison Rossett (1999). *First Things Fast: A Handbook for Performance Analysis*. Jossey-Bass. 241 pages. ISBN 0787944386.

Charles M. Reigeluth (Editor) (1983). *Instructional-Design Theories and Models: An Overview of their Current Status***.** Lawrence Erlbaum Associates. 487 pages. ISBN 0-89859-275-5.

Charles M. Reigeluth (Editor) (1999). *Instructional-Design Theories and Models: A New Paradigm of Instructional Theory. Vol. II.* Lawrence Erlbaum Associates. 715 pages. ISBN0-8058-2859-1.

Tennyson, Robert D., Schot, Franz, Norbert, Seel & Dijkstra, Sanne. (Editors) (1997). *Instructional Design International Perspective, Volume 1, Theory, Research, and Models***.** Lawrence Erlbaum Associates. 475 pages. ISBN 0-8058-1397-7.

Sanne Dijkstra, Norbert Seel, Franz Schott & Robert D. Tennyson (Editors) (1997). *Instructional Design: International Perspective Vol. 2: Solving Instructional Design Problems.* Lawrence Erlbaum Associates. 418 pages. ISBN 0805814000.

George M. Piskurich, Peter Beckschi, and Brandon Hall (Editors) (1999). The ASTD *Handbook of Training Design and Delivery: A Comprehensive Guide to Creating and Delivering Training Programs -- Instructor-led, Computer-based*. McGraw Hill. 530 pages. ISBN 0071353105.

Charles R. Dills & A. J. Romiszowski (Editors) (1997). *Instructional Development Paradigms***.** Educational Technology Publications. 882 pages. ISBN 08777882954.

Sanne Dijksra, Bernadette van Hout Wolters & Pieter C. van der Sijde (Editors) (1990). *Research on Instruction: Design and Effects*. Educational Technology Publications. ISBN 0877782210.

David H. Jonnassen (Editor) (1996). *Handbook of Research on Educational Communications and Technology*. Macmillan. 1267 pages. ISBN 0028646630.

Byron Reeves & Clifford Nass (1996). *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places.* Cambridge University Press. 305 pages. ISBN 1-57586-053-8.

Donald A. Norman (1990). *The Design of Everyday Things.* Doubleday & Company. 256 pages. ISBN 0385267746,

Be A Better Needs Analyst (1985). *Training and Development* (February), American Society For Training And Development.

Briggs, L. J. and Wager, W. W. (1981). *Handbook of Procedures for the Design of Instruction* (2nd Ed.). Englewood Cliffs, New Jersey: Educational Technology Publications.

Carlisle, K. E. (1986). *Analyzing Jobs and Tasks*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Davies, I. K. (1976). *Objectives in Curriculum Design*. London: McGraw Hill Co.

Dick, W. and Carey, L. (1990). *The Systematic Design of Instruction* (3rd Ed.). Glenview, Illinois: Harper Collins Publishers.

Gagné, R. M. (1985). *The Conditions of Learning and Theory of Instruction* (4th Ed.). New York: Holt, Rinehart, and Winston.

Gagné, R. M., Briggs, L. J. and Wager, W.W. (1992). *Principles of Instructional Design* (4th Ed.). New York: Texas; Harcourt Brace Jovanovich.

Kaufman, R., Rojas, A. M. and Mayer, H. (1993). *Needs Assessment: A User's Guide*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Kibler, R. J. (1981). *Objectives of Instruction*. Boston, Massachusetts: Allyn and Bacon.

Knirk, F. G. and Gustafson, K. L. (1986). *Instructional Technology: A Systematic Approach to Education*. New York: Holt, Rinehart, and Winston.

Leshin, C. B., Pollock, J. and Reigeluth, C. M. (1992). *Instructional Design Strategies and Tactics*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Mager, R. F. (1962). *Preparing Objective for Instruction* (2nd Ed.). Belmont, California: Fearon Publishers.

Reiser, R. A. and Gagné, R. M. (1993). *Selecting Media for Instruction*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Rossett, A. (1987). *Training Needs Assessment*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Rossett, A. and Gautier-Downes, J. (1991). *A Handbook of Job Aids*. San Diego, California: Pfeiffer & Co.

Wolfe, P., Wetzel, M., Harris, G., Mazour, T. and Riplinger, J. (1991). *Job Task Analysis: Guide to Good Practice*. Englewood Cliffs, New Jersey: Educational Technology Publications.

Zemke, R. and Kramlinger, T. (1982). *Figuring Things Out: A Trainer's Guide to Needs and Task Analysis*. Reading, Massachusetts: Addison-Wesley Publishing Co., Inc.

Abbreviations and Acronyms

AETC	Air Education and Training Command
AF	Air Force
AFH	Air Force Handbook
AFJQS	Air Force Job Qualification Standard
AFMAN	Air Force Manual
AFPAM	Air Force Pamphlet
AFPD	Air Force Policy Directive
AFS	Air Force Specialty
AFSC	Air Force Specialty Code
AMQTP	Auxiliary Maintenance Qualification Training Package
AV	Audiovisual
CAI	Computer-Assisted Instruction
CAMS	Core Automated Maintenance System
CAR	Customer Account Representative
CBPO	Consolidated Base Personnel Office
CCPO	Central Civilian Personnel Office
CDC	Career Development Course
CFETP	Career Field Education and Training Plan
CJQS	Command Job Qualification Standard
EPA	Environmental Protection Agency
EST	Enlisted Specialty Training
FTD	Field Training Detachment
ICW	Interactive Courseware
IMA	Individual Mobilization Augmentee
ISD	Instructional System Development
JPG	Job Performance Guide
JQS	Job Qualification Standard
MAJCOM	Major Command
MET	Management Engineering Team
MTL	Master Task List
OI	Operating Instruction
OJT	On-the-Job Training
OPLAN	Base Operations Plan
OPR	Office of Primary Responsibility
ORI	Operational Readiness Inspection
OSHA	Occupational Safety and Health Agency
OSR	Occupational Survey Report

PDO	Publications Distribution Office
PDS	Personnel Data System
QA	Quality Assurance
QAF	Quality Air Force
QC	Quality Control
QI	Quality Improvement
QTP	Qualification Training Package
SAV	Staff Assistance Visit
SC	Specialized Course
SEI	Special Experience Identifier
SME	Subject Matter Expert
SOJT	Structured On-the-Job Training
STAN/EVAL	Standardization Evaluation
STP	Specialized Training Package
STS	Specialty Training Standard
TDY	Temporary Duty
TNA	Training Needs Assessment
TO	Technical Order
TR	Technical Reference
UGT	Upgrade Training
UMD	Unit Manning Document
USAF	United States Air Force
USAFR	United States Air Force Reserve
U&TW	Utilization and Training Workshop
VCR	Video Cassette Recorder

Terms

Attitude. (a) The emotions or feelings that influence a learner's desire or choice to perform a particular task. (b) A positive alteration in personal and professional beliefs, values, and feelings that will enable the learner to use skills and knowledge to implement positive change in the work environment. Also see Knowledge and Skill.

Advanced Training. A formal course training toward a technical or supervisory level Air Force specialty (AFS). Training is for selected career airmen at the advanced level of an AFS.

Air Force Enlisted Specialty Training System. The total training process (life cycle) used to qualify airmen in their assigned specialty.

Air Force Specialty. A group of duty positions that require common qualification identified by a title and code.

Behavior. Any activity, overt or covert, capable of being measured.

Behavioral Objective. See Learning Objective.

Body. Major section of a lesson during which learning activities are sufficiently developed to achieve instructional objective. Usually preceded by an introduction and followed by a conclusion.

Condition. That portion of a learning objective which describes the situation/environment in which the trainees write/express/perform the specified behavior. Conditions include any pertinent influence on task performance, including any or all of the following: location of performance, environment, equipment, manuals, or supervision required.

Computer-Assisted Instruction (CAI). The use of computers to aid in the delivery of instruction. A variety of interactive instructional modes are used including tutorial, drill and practice, gaming, simulations, or combinations. CAI is an integral part of computer-based instruction (CBI) and computer-based training (CBT).

Computer-Based Instruction (CBI) or Computer-Based Training (CBT). The use of computers to aid in the delivery and management of instruction. CBI and CBT are synonymous and are used interchangeably. CAI (the delivery of instruction) and CMI (computer-managed instruction) are both elements of CBI and CBT.

Computer-Managed Instruction (CMI). The use of computers to manage the instructional process in CAI or CBT. Management normally includes functions such as registration, pretesting, diagnostic counseling, progress testing, and

posttesting. CMI is also used to schedule and manage training resources such as trainers and equipment.

Constraints. Limiting or constraining conditions or factors, such as a policy considerations, time limitations, equipment, environmental factors, personnel, budgetary, or other resource limitations.

Courseware. Training materials such as technical data, textual materials, audiovisual instructional materials, computer-based instructional materials.

Duty. A large segment of the work done by an individual; major divisions of work in a job.

Environment. The physical conditions and surroundings in which a job is performed, or in which learning takes place, including tools, equipment, and job aids.

Evaluation. A judgment expressed as a measure or ranking of trainee achievement, instructor performance, process, application, training material, and other factors (see MIL-HDBK-29612).

External Evaluation. The acquisition and analysis of feedback data from outside the formal training environment to evaluate the graduate of the instructional system in an operational environment.

Field Training. Technical, operator, and other training conducted at operational locations on specific systems and associated direct-support equipment for maintenance and aircrew personnel. Either a field training detachment or mobile training team may conduct.

Instructional System. An integrated combination of resources (trainees, trainers, materials, equipment, and facilities), techniques, and procedures performing effectively and cost-efficiently the functions required to achieve specified learning objectives.

Instructional System Development (ISD). A deliberate and orderly, but flexible, process for planning, developing, implementing, and managing instructional systems. It ensures that personnel are taught in a cost-efficient way the skills, knowledge, and attitudes essential for successful job performance.

Interactive Courseware (ICW). Computer-controlled training designed to allow the student to interact with the learning environment through input devices such as keyboards and light pens. The trainee's decisions and inputs to the computer determine the level, order, and pace of instructional delivery, and forms of visual or aural outputs.

Internal Evaluation. The acquisition and analysis of feedback and management data from within the formal training environment to assess the effectiveness and cost-efficiency of the instructional system.

Job. The duties, tasks, and task elements performed by an individual. The job is the basic unit used in carrying out the personnel actions of selection, training, classification, and assignment.

Job Aid. A checklist, procedural guide, decision table, worksheet, algorithm, or other device used by a job incumbent to aid in task performance. Job aids reduce the amount of information that personnel must recall or retain.

Job Performance Requirements (JPR). The tasks required of the human component of the system, the conditions under which these tasks may be performed, and the quality standards for acceptable performance. JPRs describe what people should do to perform their jobs.

Job Qualification Standard (JQS). A list of tasks an individual is required to perform in his/her current job. Lists contain day-to-day production, contingency, and AFI 36-2108 mandatory requirements.

Knowledge. Use of the mental processes that enable a person to recall facts, identify concepts, apply rules or principles, solve problems, and think creatively. Knowledge is not directly observable. A person manifests knowledge through performing associated overt activities. Also see Attitude and Skill.

Learning Objective. A statement of the behavior or performance expected of a trainee as a result of a learning experience, expressed in terms of the behavior, the conditions under which it is to be exhibited, and the standards to which it will be performed or demonstrated. Also called Training Objective or Behavioral Objective. Also see Objective.

Lesson Plan (LP). An approved plan for instruction that provides specific definition and direction to the instructor on learning objectives, equipment, instructional media material requirements, and conduct of training. Lesson plans are the principal component of curriculum materials in that they sequence the presentation of learning experiences and program the use of supporting instructional material.

Media. The delivery vehicle for presenting instructional material or the basic or basic communication stimuli to a student to include learning. Examples are instructors, textbooks, slides, and interactive courseware (ICW).

Objective. Statement that specifies precisely what behavior is to be exhibited, the conditions under which behavior will be accomplished, and the minimum standard of performance. Objectives describe only the behaviors that directly

lead to or specifically satisfy a job performance requirement. An objective is a statement of instructional intent. Also see Learning Objective.

On-the-Job Training (OJT). Individual training in designated job skills provided to individuals serving in job positions in operational units.

Performance. Part of a criterion objective that describes the observable student behavior (or the product of that behavior) that is acceptable to the trainer as proof that learning has occurred.

Proficiency Training. (a) Training conducted to improve or maintain the capability of individuals and teams to perform in a specific manner. (b) Training to develop and maintain a given level of skill in the individual or team performance of a particular task.

Qualification Training. Actual hands-on task performance training designed to qualify an airman in a specific duty position. This training program occurs both during and after the upgrade training process. It is designed to provide the performance skills required to do the job.

Quality Air Force. A management philosophy and a methodology that work together to produce continuous process improvements. QAF implements Total Quality Management (TQM) in the Air Force.

Quality Improvement (QI). The organized creation of beneficial change; improvements made in products procedures, learning, etc.

Reliability. (a) A characteristic of evaluation, which requires that testing instruments yield consistent results. (b) The degree to which a test instrument can be expected to yield the same result upon repeated administration to the same population. (c) The capability of a device, equipment, or system to operate effectively for a period of time without a failure or breakdown.

Skill. The ability to perform a job-related activity that contributes to the effective performance of a task. Skills involve physical or manipulative activities, which often require knowledge for their execution. All skills are actions having specific requirements for speed, accuracy, or coordination. Also see Attitude and Knowledge.

Specialty Training Standard (STS). An Air Force publication that describes an Air Force Specialty (AFS) in general terms of tasks and knowledge that an airman in that specialty may be expected to perform or to know on the job. It further serves as a contract between Air Education and Training Command (AETC) and the functional user as to which of the overall training requirements for an Air Force specialty code are taught in formal schools.

Standard. A document that establishes engineering and technical requirements for items, equipment, processes, procedures, practices, and methods that have been adopted as standard. Standards may also establish requirements for selection, application, and design criteria for material. Military standards are documents issued within the Department of Defense in accordance with the basic policy of the Defense Standardization Program (see MIL-STD-962).

Subject Matter Expert (SME). (a) An individual who has thorough knowledge of a job, duties/tasks, or a particular topic, which qualifies him/her to assist in the training development process (for example, to consult, review, analyze, advise, or critique). (b) A person who has high-level knowledge and skill in the performance of a job.

Task. A unit of work activity or operation that forms a significant part of a duty. A task usually has clear beginning and ending points and directly observable or otherwise measurable processes, frequently but not always resulting in a product that can be evaluated for quantity, quality, accuracy, or fitness in the work environment. A task is performed for its own sake; that is, it is not dependent upon other tasks, although it may fall in a sequence with other tasks in a duty or job array.

Task Analysis. The process of describing job tasks in terms of Job Performance Requirements (JPR) and the process of analyzing these JPRs to determine training requirements. Also see Job Performance Requirements.

Task Step. Any of the sequential, component steps in a larger task; behaviors en route to an objective.

Teaching Guide. See Lesson Plan.

Training. A set of events or activities presented in a structured or planned manner, through one or more media, for the attainment and retention of skills, knowledge, and attitudes required to meet job performance requirements.

Training Needs Assessment (TNA). Needs assessment is the study of performance and the environment that influences it in order to make recommendations and decisions on how to close the gap between the desired performance and the actual performance.

Training Planning Team (TPT). An action group composed of representatives from all pertinent functional areas, disciplines, and interests involved in the life cycle design, development, acquisition, support, modification, funding, and management of a specific defense training system.

Training Requirement. The skills, knowledge, and attitudes that are needed to satisfy the job performance requirements, and that are not already in the trainee's incoming repertoire.

Upgrade Training. Training administered for the purpose of upgrading skill level.

Utilization and Training Workshop (U&TW). A forum to determine Specialty Training Standard requirements and responsibilities for the specialty. Workshop attendees include, but are not limited to, representatives from the training and using organizations.

Validation. The process by which the curriculum materials and training media materials are reviewed for instructional accuracy and adequacy, suitability for presentation, and effectiveness in proving for the trainees' accomplishment of the learning objective.

Validity. The degree to which a test measures what it was designed to measure.